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The Association does not accept the responsibility for the opinions of contributors. Offensive personalities must be avoided.

Samuel A. D. Sheppard

(Doctor of Pharmacy.)

In conferring the honorary degree of Doctor of Pharmacy on Mr. S. A. D. Sheppard, the Massachusetts College of Pharmacy has paid a deserved tribute to one of the most highly esteemed American pharmacists. The honor was bestowed in recognition of his distinguished services to pharmacy; the ceremony occurred as a part of the commencement exercises held May 20, 1915.

This is only the second time in the history of the Massachusetts College of Pharmacy that an honorary degree has been conferred, hence expresses the high regard of that institution for Mr. Sheppard. Many pharmacists of this country will be pleased that such acknowledgment has been made, and none more than members of the American Pharmaceutical Association.

Mr. Sheppard was an active worker for the advancement of pharmacy for more than two score of years before his health failed. He has held many positions of responsibility and honor in national and state pharmaceutical associations, never sparing himself, nor his time, nor his means, when need arose. He joined the American Pharmaceutical Association in 1865; in 1875 he served as local secretary for the Boston meeting of that year; in 1876 he was elected First Vice-President; he was a member of the first council of the Association in 1880 and chairman of the finance committee. In 1886 he was elected Treasurer of the Association and filled this office for twenty-two consecutive years; and in 1908 he was elected Honorary President.

Many other pharmaceutical associations have shared the benefits of his work. He was a charter member of the Boston Druggists' Association, the first President of the Massachusetts State Pharmaceutical Association, a member of the first State Board of Pharmacy of Massachusetts, a trustee, treasurer and president of the Massachusetts College of Pharmacy, and, a few years ago, he presented his large and valuable collection of pharmacopœias and dispensatories of all nations to that college.

Contributed and Selected

SYNTHESIS OF GLUCOSIDES.*

H. ENGELHARDT, PH. D.

Glucosides occur very abundantly in the vegetable kingdom. They have the properties of being hydrolyzed by the action of dilute acids, dilute alkalies, enzymes and at times even by heating with water. They are converted into dextrose and other sugars and into substances of more or less complex constitution.

The glucosides are generally present in the assimilation organs of the plants, i. e., the leaves; very rarely are they found in the reserve organs, the rhizomes or the seeds. Most of the glucosides contain only carbon, hydrogen and oxygen; only a few, such as amygdalin, solanin, etc., contain nitrogen or, like myronic acid and sinalbin, sulphur. Chemically the glucosides must be considered as ester-like compounds of sugars, mostly dextrose. The sugars, however, are not pre-existent in the glucosides but are formed from them by hydrolysis, that is by taking up the elements of water. The amount of water taken up varies considerably. Thus: Salicin takes up one molecule, populin takes up two molecules, hesperidin takes up three molecules, helleborin takes up four molecules, jalapin takes five molecules, sinigrin takes up seven molecules, etc.

For isolating the glucosides no general process can be given on account of the ease with which they are hydrolized. Strong mineral acids and strong basic compounds should be avoided in the manufacturing process as well as prolonged boiling. If the drugs containing the glucosides also contain a hydrolyzing ferment the latter should first be eliminated. This can be done by treating the dried powdered drug with boiling alcohol which contains a small amount of calcium carbonate in order to neutralize any free vegetable acid, and continuing the heating for about one hour. After cooling the liquid is filtered, the alcohol is evaporated at moderate heat or preferably in a vacuum, and from the thick alcoholic residue the glucoside is extracted by boiling with neutral acetic ether; or the alcoholic extract is dissolved in water in the presence of small amounts of calcium carbonate, the solution is filtered and the filtrate evaporated under diminished pressure. The residue is then extracted with alcohol, acetic ether, acetone or other suitable solvents and the resulting solutions allowed to crystallize. At times it is necessary to defecate the alcoholic extract by carefully adding lead acetate solution. The precipitate, thus produced, is then removed by

* Read before Baltimore Branch, A. Ph. A., April Meeting.

filtration, the filtrate is deprived of the lead by hydrogen sulphide gas and the glucoside is allowed to crystallize at moderate heat.

The substances which are produced when hydrolizing glucosides are chiefly hydroxyl compounds (phenols, alcohols, aldehydes, acids) both of the aliphatic and of the aromatic series. About the constitution of these products very little is known at the present time and therefore only few of the glucosides occurring in nature could be synthesized. It was possible, however, to combine alcohols, mercaptols, phenols, etc., directly with dextrose.

Since glucosides contrary to dextrose do not act directly with phenylhydrazine with the formation of osazones, do not reduce Fehling's solution or ammoniacal silver solution, they cannot contain the aldehyde group peculiar to dextrose. They, therefore, can be compared with cane sugar and with the simplest synthetic glucosides—methyl- and ethyl-glucoside.

The glucosides are solid, non-volatile, generally crystallizable compounds which are soluble in water and alcohol with neutral reaction. The enzymes act in a very peculiar way on the glucosides. For instance, emulsin hydrolyzes amygdalin, salicin, esculin, coniferin, etc., but not sinigrin. The enzymes from yeast hydrolyze amygdalin with the formation of amygdonitril glucoside and one molecule of dextrose. Emulsin, however, hydrolyzes amygdalin completely with the formation of two molecules of dextrose and one molecule of benzaldehyde-hydrocyanic acid. The full activity of emulsin obtained from almonds can only be properly explained by assuming the presence of a number of enzymes, none of which, however, so far has been isolated from it. One of these, beta-glucosidase hydrolyzes certain glucosides, another lactase, acts on lactose, a third one, beta-galactosidase, acts on certain galactosides, a fourth one, gentiobiase, acts on gentiobiose, etc.

Notwithstanding our extensive knowledge concerning the hydrolysis of the various glucosides and of the action of the various enzymes up to the present time, as already mentioned, only very few of the glucosides found in nature have been prepared synthetically.

The first attempts to synthesize glucosides were made by Schuetzenberger (Ann. d. Chem. u. Pharm. CLX, 95) who tried to obtain salicin by the action of triacetyl-dextrose and saligenin sodium. He obtained, however, a substance which was not identical with salicin but which on hydrolyzing with diluted sulphuric acid yielded glucose and saliretin. Later on Michael (Ber. Deutsch. Chem. Ges., 1881, 2097) succeeded in obtaining compounds of dextrose with phenols which behaved exactly like the natural glucosides. The formation of these substances depended on the interaction of acetochlorohydrose or acetrobromohydrose and the alkali salts of phenols. For instance, starting from these substances and salicylaldehyde potassium he obtained helicin and acetic ether. Helicin, which can be obtained from salicin by careful oxidation, therefore was the first natural glucoside produced synthetically. From this comparatively simple glucoside Fisher and Kees (Ber. Deutsch. Chem. Ges., 1885, 1953 and 3481) succeeded in obtaining synthetically the more complex orthocumaraldehyde glucoside. Schiff (Ann. CCXXIV, 19) then tried to produce glucosides by allowing aldehydes and ketones to act on sugar in acetic acid solution. The substances thus obtained were very hygroscopic and were hydrolized already by

water. Emil Fisher (Ber. Deutsch. Chem. Ges., 1893, 2928) finally succeeded in synthesizing glucosides by conducting hydrochloric acid gas into a solution of dextrose in methyl alcohol. The mixture soon lost its property to reduce Fehling's solution and a crystalline product of the composition $C_6H_{11}O_6.CH_3$ which behaved like a natural glucoside and which has been named methyl glucoside was obtained. This process was later on improved by Fisher (Ber. Deutsch. Chem. Ges., 1895, 1145) by using instead of strong hydrochloric acid only very diluted acid and accelerating the reaction with the aid of heat. The dextrose was dissolved in five times its quantity of methyl alcohol which contained only .25 percent of hydrochloric acid and was heated for 50 hours at 100° or until the liquid no longer reduced Fehling's solution. By this process he was able to methylize fructose and sorbose and also to condense these sugars with ketones which could not be done when strong hydrochloric acid was employed. In a similar manner he succeeded in condensing sugars with mercaptanes, etc.

In 1898 A. C. Hill (Proc. Chem. Soc., 1898, 156), noticed that when bottom fermentation yeast prepared and purified by a special process was allowed to act on maltose, the hydrolysis could be carried out only to a certain point, and further that under certain conditions a reconstruction of the maltose apparently took place. This observation was also noticed by several other investigators but it was not until about three or four years ago that Bourquelot and his associates and pupils could prove that enzymes which hydrolyze glucosides can reconstruct them from the products of hydrolysis under certain conditions and further that by the action of enzymes glucosides can be formed, in other words, that enzymes exhibit both a hydrolyzing and synthesizing action. Further that the same enzyme can both hydrolyze and synthesize and that the action is not due to two ferments existing side by side in the same enzymes.

Bourquelot found that while preparing tinctures from certain vegetable drugs with strong alcohol changes take place during the manufacturing process, which could be due only to the action of enzymes, which apparently are not killed by strong alcohols as is generally accepted. Together with Bridel (Journal. Pharm. Chim., 1911, II, 385) he found that emulsin acts hydrolyzing on gentiopicrine in the presence of strong alcohol although the enzyme is not soluble in alcohols of a strength higher than 60 percent. The same holds good for invertase, which is also very resistent against alcohol.

While some enzymes resist the destructive action of ethyl alcohol quite well, they are comparatively easily destroyed by other alcohols. Thus for instance, by dilute methyl alcohol containing 34 to 36 percent by weight of the alcohol, normal propyl alcohol containing 20 to 22 gms. of the alcohol, butyl alcohol containing 6 to 8 percent by weight of alcohol. Bourquelot and Bridel (Journ. Pharm. Chim., 1912) later on found that emulsin not only hydrolyzes but synthesizes and that other enzymes have similar properties. Bourquelot and Bridel (Journ. Pharm. Chim., 1912, 569) then attempted to synthesize salicin from solutions of saligenin and dextrose in 85 percent alcohol in the presence of emulsin, but only betamethyl glucoside was obtained. (Previously they had found that in aqueous solution the hydrolysis of salicin with emulsin ceases when 54.7 percent of salicin had been hydrolyzed.)

Bourquelot soon succeeded in synthesizing quite a number of glucosides, starting from methyl alcohol, ethyl alcohol, butyl alcohol, isobutyl alcohol, geranyl alcohol, etc., and also from some alcohols of the aromatic series, benzyl alcohol, phenylethyl alcohol, cinnamyl alcohol, naphthyl alcohol, etc. (Bourquelot and Bridel, Compt. rend. CLVI, 827). Almost all the glucosides, thus prepared, crystallized quite readily. The beta-geranyl glucoside which Bourquelot and Bridel obtained (Jour. Pharm. Chimie., 1913, 209) was found to be identical in every respect with the glucoside present in pelargonium odoratissimum.

Glucosides of solid water-insoluble alcohols may be prepared by using acetone as a solvent and varying quantities of water. Bourquelot further found that primary alcohols are converted into glucosides more readily than secondary, and the latter more readily than tertiary alcohols. All substances containing alcoholic hydroxyl groups form glucosides with dextrose in the presence of emulsin. The compounds obtained are beta-glucosides, and like natural glucosides are levorotatory and hydrolyzable by emulsin. It would be beyond the scope of this paper to relate in detail the excellent work carried out by Bourquelot and therefore only a few more synthesized glucosides may be mentioned. α alcohol-glucosides are prepared by allowing the enzyme α glucosidase present in bottom-fermentation yeast to act on dextrose in alcoholic solutions. The alcoholic strength of the liquid should be weaker than that used for synthesizing β glucosides with emulsin. These α glucosides are dextrorotatory and are not hydrolyzed with emulsin.

When emulsin is allowed to act on galactose in alcoholic solution β ethyl galactoside is formed by the β glucosidase present in emulsin. (Bourquelot and Mougne, Journ. Pharm. Chim., 1914, 157.) Analogous glucosides were obtained when using methyl, benzyl, etc., alcohols.

That some enzymes act synthetically in aqueous solution was shown by allowing emulsin of almonds to act upon a concentrated solution of dextrose at ordinary temperature in the presence of thymol, phenol, etc. (Bourquelot, Herissey and Coirre, Compt. Rend. CLVI, 752.) After allowing to stand for some time the solution was heated to destroy the enzymes, diluted and the undecomposed dextrose was destroyed by fermentation with top fermentation yeast. From the solution thus obtained gentiabiose in pure state could be isolated.

The synthesizing of glucosides is a rather tedious and time-consuming process. For instance, in order to prepare β methyl glucoside, 12 gms. of emulsin are added to a solution of 600 gms. of dextrose in 1020 gms. of methyl alcohol and 440 gms. of water; after allowing the mixture to stand for one month at ordinary temperature about 350 gms. of crude glucoside was obtained which when purified yielded 250 gms. of pure product.

A few words may be said in regard to the reversibility of enzyme action. If a methyl alcoholic solution containing dextrose and β methyl glucoside is treated with emulsin, a state of equilibrium of the synthesizing and hydrolyzing action of the enzyme is obtained. (Bourquelot and Bridel, Compt. rend. CLVI, 957.) When this equilibrium has been attained, further synthesis can be induced by the addition of sugar and on the other hand further hydrolysis may be promoted by the removal of sugar (Bourquelot and Bridel, Compt. rend. CLVIII, 206).

On the strength of numerous experiments Bourquelot arrives at the following conclusions:

1. The rapidity of synthesis increases with the quantity of enzyme present.

2. The action of the enzyme is accelerated by raising the temperature provided, however, the temperature at which the enzyme is destroyed is not exceeded.

3. For equal concentrations of dextrose the proportion converted into glucoside increases with the alcoholic strength and when the latter is kept constant is increased by raising the concentrations of the dextrose up to a limit of 15 to 20 percent.

While the above experiments so far are of little practical value, inasmuch as only a few of the natural glucosides have been prepared up to the present time, they throw considerable light on the chemical changes going on in plant life. The better known enzymes will therefore become a valuable guide in the study of chemistry in the living organism. As long as we only knew that enzymes have a hydrolyzing action on glucosides, they could only be used for detecting glucosides and polysaccharites in plants. Now, since we know, that they have a synthesizing action also, the results obtained by hydrolysis can be verified by those obtained by synthesis. Dextrose is present in all plants. When therefore a plant contains a ferment it points to the presence of the corresponding glucoside. This has been verified in the ericaceæ, the gentians and quite recently in various orchidaceæ. Also in many species of the scrophulariaceæ, especially of the genus linaria, in leguminosæ, proteaceæ, etc. On account of their specific action the enzymes will gradually become the most delicate and certain reagents for the study of the constitution of certain organic compounds. In plant physiology biochemical synthesis is an important factor in the production of food materials. Certain organic compounds which are insoluble in water, form with dextrose soluble compounds. Since dextrose is present in all living organisms it seems to be the best liquifying agent under certain conditions and seems to prevent the formation of certain concretions and to dispose of compounds dangerous to the organism of the plant.

On the other hand the reversibility insures the maintenance of the equilibria necessary for life. In organisms where life is active the liquid media are particularly favorable to hydrolysis, i. e., to the utilization of food materials. In reserve organs, for instance the seeds, the medium becoming gradually less aqueous, is more favorable to synthetic processes. (Bourquelot, Journ. Pharm. Chim., 1914, 361 and 393.)

Whenever the chemical constitution of the products of hydrolysis of natural glucosides shall have been established we shall, without doubt, be in a position to produce such glucosides synthetically.

HYDROGENATED OILS.*

ANDREW CAMPBELL.

Broadly speaking, the chemical combinations presented in fixed oils and fats are glycerides of various fatty acids. The formulæ of these characteristic acids, again broadly speaking, differ from one another principally in the number of the contained hydrogen atoms, while the physical properties of the various oils seem to be dependent upon the underlying character and proportions of these acids.

Oleic and stearic acids are the most commonly presented of these substances and the physical difference caused by these two constituents is largely manifested in that oleic acid combinations give oils and fats of soft or liquid consistency while stearic acid, as a rule, is characteristic of the harder fats.

The chemical formula recognized for oleic acid is $C_{18}H_{34}O_2$, while that for stearic acid is $C_{18}H_{36}O_2$. Two hydrogen atoms, then, added to oleic acid will transform it into stearic acid. It has long been apparent that such a transformation, if it could be economically accomplished, would be of great commercial importance. The purely chemical possibility of this step was long ago demonstrated, but it has only been within recent years that practical processes, workable under commercial conditions have been devised for carrying out this chemical transformation of oleic into stearic acid or of olein and its related substances into stearin and similar bodies. It might be remarked in passing that this exact problem is very neatly solved in the economy of nature when the steer, fattened, say, on cottonseed meal, gives us tallow and oleo-stearin, but owing to the wastefulness of this process, the modern oil-chemist by his direct methods may well claim to outdo the steer.

The essential feature of all the modern hardening processes is to bring about intimate contact between the oil under treatment and gaseous hydrogen in the presence of a third substance known as a catalyzer. Numerous catalyzers have been proposed, but finely divided metallic nickel is probably the most typical. A great variety is also shown in the forms of apparatus devised for the accomplishment of the process, many of which have been the subjects of patents.

The two greatest apparent fields of usefulness for such a process seem to be the production of edible fats and the bringing into range of soap-making materials vegetable and animal oils which have hitherto been unavailable on account of the relative softness of their products or for certain other technical reasons. Hardened oils will probably find other wide uses in the arts, for example in the manufacture of lubricants, but for the present the production of edible fats and of soap-making materials is of paramount importance in the development of the process.

Two seemingly contradictory statements may be made in regard to hydrogenated oils. One is that their production is quite simple and can be carried out without elaborate or expensive apparatus and the other is that commercial success can be

* Read before the Pittsburgh Branch, A. Ph. A.

attained only in rather expensive and well-equipped plants. The necessary supply and handling of hydrogen at a reasonable cost are the controlling factors of such a situation.

In the simplest form of apparatus provision only need be made for carrying a stream of hydrogen through the oil in the presence of the catalyzer at a slightly elevated temperature. On the other hand, some of the most complex and elaborate forms of apparatus have been designed and patented in great variety with a view to making the process commercially efficient.

As to catalyzers, metallic nickel seems to be most favored, but palladium is well regarded and platinum, iron and copper have been used. Oxides of these same metals have also been exploited as suitable catalyzers and one of the inventors in the line has patented the use of various organic salts of similar metallic elements. A great variety of schemes have been tried for making the catalyst not by itself but deposited in a fine state of division on the surface of some inert carrying substance. Pumice stone, kieselguhr, charcoal and sawdust have all been used. The production of a good catalyzer requires considerable care and technical skill. In the case of nickel the steps are precipitation of a nickel nitrate solution by means of alkali and the subsequent reduction of the precipitated hydroxide by heating in a current of hydrogen. Particular care is needed in controlling the temperature of the reduction process. Protection from air and moisture is required after reduction and the catalyzers are subject to the peculiar fact that the presence of even very small amounts of chlorine and sulphides greatly depreciates their activity. This is spoken of as "poisoning" the catalyzer.

Inasmuch as the hardening process is only an application of previously known chemical reactions, no basic patents can be sustained on it. Consequently we find that the many patents issued in connection with the matter fall naturally into two classes, those on particular catalyzers and the methods for producing the same and those on apparatus and devices for carrying out the general process. The catalyzer patents are of the most importance and one firm of English soap-makers, Crossfield & Sons, seems to have made some attempt at monopoly, having acquired the patents on nickel, palladium and platinum. Such an attempt, however, would not seem to be effective since numerous other patents have been issued for the oxides and the Wimmer patents cover the use of organic salts. The oxide patents are mostly held by the combination known in the trade as the Bedford-Erdman-Williams interests. Then, too, one process has been devised which dispenses entirely with catalyzers and carries out the hydrogenation by the application of hydrogen alone but at comparatively high pressures.

A great variety of fatty oils may be treated with a view to increasing their economic usefulness. The most important, on account of the utility of their hardened products, are the liquid vegetable oils such as cottonseed, corn, sesame, castor and linseed oils and the marine animal oils such as menhaden, fish and whale oils. Cottonseed oil has been the principal product under exploitation, although much work has been done abroad on fish and whale oils. Hardened cottonseed oil yields products of use in the manufacture of lard compounds and butter substitutes and the hardened train oils are equal or superior to the higher-priced tallows for soap makers.

The question of the safety and healthfulness of the edible products yielded by this method has been carefully investigated and no criticism can stand against them if care is used to eliminate the possible traces of metallic contamination originating from the catalyzing elements. Taste, odor and color of many of the oils are very much improved. Particularly is this true of the disagreeable odor of the marine oils which thorough treatment by hydrogenation seems absolutely to remove. As to this point it is interesting to note that the Japanese chemist, Tsujimoto, has demonstrated that the odor and taste of fish oil instead of being due to impurities, as had been supposed, are really caused by the presence of a characteristic fatty acid, clauponodonic acid, having the formula $C_{18}H_{28}O_2$, which by the addition of eight hydrogen atoms becomes stearic acid and loses its odor and taste.

Much has been reported and written about the possible wonderful cheapening of soap makers' materials, but this has been considerably exaggerted, at least for the immediate future. In Germany a perfectly odorless, white, hardened train oil has been offered on the market at 66 marks per 100 kilos, which compares with a price in the same market of 72 marks per 100 kilos for prime boiling tallow. As the process becomes better developed and more widely used very material reductions in the price of the products may be reasonably expected. As has already been indicated, no monopoly of the process is likely to be established, but on the other hand it will not be available for small fat and soap industries, on their own premises, largely on account of the expense necessary to secure the requisite supply of hydrogen at an economical price.

Factories have been established for working the process in Germany and England, while recently a Norwegian-German company has built a factory at Friedrichstad, utilizing the water-power of Hafslund Falls for the electricity needed in the works and for the production of hydrogen by the electrolytic method. This factory is expected to utilize about 300 barrels of oil daily. So far as I am aware, but one commercial project on any considerable scale has been attempted in this line in the United States. This is located at Ivorydale, Ohio, and operates under the name of the American Oil Treating and Hardening Company. A close connection with one of the large soap manufacturing concerns would seem to be indicated, but both edible and inedible hardened fats are advertised and offered by this company.

It is one of the striking facts of modern industry that so large and important developments should proceed from the utilization of such a simple and apparent chemical reaction. One is lead to a remark, which while trite is exceedingly apropos, that only the merest surface of the broad field of chemical invention has thus far been touched, and in spite of all the accomplishments of the past fifty or one hundred years, the future holds most wonderful prospects for development and achievement in chemistry. It is equally true that it is not always the abstruse and complex in chemistry that holds out the greatest possibilities, but frequently some very simple reaction carries the secret of a new industry.

THE ROLE OF ENZYMES IN CHEMICAL CHANGES.*

C. H. MARYOTT, B. S., PH. D.

Formerly it was thought that the chemical changes involved in the process of living matter sprung from a special vital force, unlike any of the material forces with which we are familiar. The assumption of this vital force was a natural sequel to the lack of knowledge concerning the nature of the changes involved in the growth and decay of plant and animal structures. Later as a number of products formerly obtained only from living organisms were made in the laboratory by familiar chemical methods, the need of any special vital agent disappeared, for it was seen that many of the chemical changes occurring in nature were not essentially different from those producible in the laboratory. The beauty and mystery of the transformations of plant and animal life, however, did not thereby suffer, for it was seen that each living cell constituted a laboratory most complete and wonderfully equipped, where reaction of the most complex nature was carried out with an ease that defied imitation. A study of the means by which these reactions are accomplished, has revealed the importance of a class of substances known as enzymes, elaborated by living cells. In their action they resemble the inorganic catalyzers and conform in general to the behavior of such.

A catalyzer is a substance which by its presence alters the rate of a chemical change, without taking, of itself, a permanent part in the reaction. There are many chemical changes going on around us which proceed so slowly under ordinary conditions that they are difficult or impossible of detection within a moderate length of time. Thus cane sugar dissolved in water, very slowly reacts with the water and yields dextrose and levulose. In the presence of hydrochloric acid, or of invertase, an enzyme procured from yeast, the change takes place rapidly, and under suitable conditions might be completed within a few hours. Neither the hydrochloric acid nor the invertase would be used up during the process, but would be present in the same amount and in the same condition after the reaction as they were before it. Likewise oxygen and hydrogen when mixed, under ordinary conditions, do not combine perceptibly, but if finely divided platinum is placed in the mixture, rapid union results, which may ignite the mixture.

Besides the fact that catalyzers accelerate reactions and that they undergo no permanent change themselves, there are several characteristics generally ascribed to them. One of the most conspicuous of these is the property which they possess of effecting an amount of chemical change out of all proportion to the amount of catalyzer used, the merest trace often causing a pronounced action; colloidal platinum will cause the decomposition of 1,000,000 times its weight of hydrogen peroxide, and invertase will act upon 200,000 times its weight of sugar.

Another characteristic of catalyzers of importance in connection with enzymes is the fact that catalytic agents do not affect the conditions of equilibrium in any

* Read at a monthly meeting of Faculty and Senior Classes, Baylor University Colleges of Medicine and Pharmacy.

chemical change. There are many reactions which do not proceed to completion, but the reaction apparently stops before all of the original reacting substances are combined. Thus fats will react with water to form glycerin and free fatty acids, but the reaction will come to an apparent halt before all of the fat is transformed. Under exact conditions there will be a definite ratio between the quantities of unchanged fat and the amounts of glycerin and free acid. The explanation of this condition is that we are dealing here not with a single reaction, but with two oppositely directed reactions, and each tends to undo the effect of the other. While it is true that fat and water react to give glycerin and acid, it is equally true that the glycerin and acid react to give the original fat and water.

The relative amount of fat that will be decomposed will be determined by the conditions of temperature and the concentration of the various substances present. Inasmuch as both of these reactions are influenced to the same extent by a catalyzer, the relative amounts of the substances present when equilibrium is reached will be the same whether a catalyzer is used or not. The fact that in such reversible reactions, the catalyzers affect with reactions alike, is of great importance physiologically, for it makes it possible that under certain conditions a substance such as a fat may be broken down by an enzyme into products which can be absorbed, and under different conditions, by this same enzyme, these products can be combined again. Thus in the body the same enzyme may effect decompositions, or it may bring about syntheses.

Though the fermentation of sugar containing solutions must have been the subject of a great deal of attention in very early times, it was not until nearly the middle of the nineteenth century that the production of alcohol and carbon dioxide was associated with the activities of the yeast cells, not until after Pasteur had completed his researches on the subject was full credence given to the belief that the yeast cell was the active instrument in alcoholic fermentation. Other ferments were known previous to that time for Reaumur as far back as 1752 had discovered the gastric enzyme pepsin, and Kirchoff in 1814 discovered the diastasic properties of sprouting barley. Emulsin and many other ferments were known. The catalytic nature of these enzymes was realized, for Berzelius in 1837 had compared them to the inorganic catalyzer, and had anticipated the tremendous importance which these enzymes have on vital processes. These enzymes just mentioned were held to act in an essentially different manner from those in yeast, lactic and butyric fermentations, which Pasteur had proved took place within the living cells and which were then believed to be possible only in conjunction with the living processes of these cells. Ferments were accordingly classified into organized and unorganized ferments. This classification prevailed until 1896, when Buchner showed that the activity of the yeast cells was due to a substance, which he called zymase, which could be separated from the cellular structure and which caused the breaking down of glucose into alcohol and carbon dioxide, independently of any living matter. The term "organized ferment" lost its original significance and since then all processes of fermentation have been looked upon as due to unorganized, non-living enzymes. At present enzymes are considered as intra-cellular or extra-cellular, depending upon whether their activity takes place normally within the living cell or outside of it.

The extra-cellular enzymes, those that are excreted into a fluid external to the cell, such as the common digestive enzymes, pepsin and trypsin, are the best known. Considerable difficulty surrounds the study of the intra-cellular enzymes, for in many cases it is impossible to separate them from the cells, and their activity must be studied while within the cell structure.

In the classification of the enzymes, they are usually grouped either according to the type of chemical reaction they accelerate, or according to the nature of the substrate that they act upon. Of the various chemical changes which take place in the living world that of hydrolysis is one of the most frequent and most important. Many substances, particularly plant and animal substances, when in the presence of water, react with the water, the molecules of the substance taking up water molecules and breaking down into simpler substances. Thus a cane-sugar molecule will react with a water molecule and break down into a molecule of dextrose and one of levulose. This process is very slow unless a catalyzer is present, but in the presence of even a very small amount of invertase, it takes place rapidly. The chemical process involved in the digestion of carbohydrates, proteins, and facts, is one of hydrolysis. Enzymes which bring about rapid hydrolysis are known as hydrolytic enzymes, and are spoken of as amylolytic, proteolytic or lipolytic, according to the substance they act upon. They are also sometimes classed as amylases, proteinases and lipases, the ending *ase* being a general suffix added to the name of the substrate. There are many other important hydrolytic enzymes besides those mentioned.

The oxidizing enzymes, or oxidases, form another widely occurring and important class, as they doubtless take an essential part in life processes. Closely related to the oxidases are the catalyses and peroxidases, which are nearly everywhere present in living matter. The catalases cause liberation of oxygen from hydrogen peroxide, and the peroxidases bring about oxidations in the presence of peroxides. These last are of particular interest, inasmuch as oxidation effected by hydrogen peroxide and the peroxides as a class, seem to resemble more closely the oxidations taking place in the tissues, than does any other type of oxidation, and it is thought probable that the peroxidases play a very important role in body metabolism. Little, however, of an exact nature is known about the metabolism enzymes. Other important groups are the sugar-splitting, or glycolytic, and protein-coagulating enzymes.

So far it has been impossible to separate any enzyme in a perfectly pure form, so that little of a definite nature is known regarding their chemical characteristics. They are all soluble in water, but are insoluble in strong alcohol, chloroform, acetone and the like. Glycerin dissolves most of them but not so well as does water. As they are colloidal substances and occur associated with protein matter, any attempt to precipitate them, throws them down always contaminated with large amounts of impurities from which it is impossible to separate them, as the methods that would be required for their purification destroys their activity. It is doubtless due to their colloidal nature and the tendency they therefore have to form adsorption compounds with other colloids, that many of the intracellular enzymes cannot be separated from the cell proteins.

The activity of enzymes is very markedly affected by slight changes in temperature. If raised above a certain temperature, usually about 50° C., their ac-

tivity rapidly falls off owing to a gradual destruction of the enzyme. All enzymes if in a moist condition are destroyed by boiling, though if in a dry state they may be heated, frequently to higher temperatures.[1] Each enzyme acts best at the temperature in which it acts in nature. For plant enzymes this is about 25° C., and for animal enzymes about 40° C.

Enzymes are likewise usually very sensitive to the reaction of the medium in which they function. Some, like pepsin, act best in a faintly acid solution, others, like trypsin, in one faintly alkaline, while some act best in neutral solutions.

There is at present some disagreement regarding the extent to which the activity of enzymes is specific. Some take the view that enzymes having similar actions are the same. Accordingly there is no ground for belief that any difference exists between the ptyalin of the saliva, and the starch-splitting enzymes of the pancreas, muscle tissue, or plants. Others incline to the view that each enzyme from a different source is different and that each is limited in its action to some particular substance. Without taking such an extreme view we can with safety conclude that there is a very high degree of specificity in enzyme action. Lipases do not act upon starch, amylases do not act upon protein, neither do proteinases act upon fats. While all lipases effect the same action on fats, namely their hydrolysis into glycerin and fatty acid, they do not all act equally well under like conditions. The lipase of the stomach acts best in a slightly acid medium, that of the pancreas occurs as a zymogen and is activated by the bile.

The work of E. Fisher shows that in the case of sugar, and the polypeptides that there is an intimate relationship between the optical properties of the molecules of the substrate and the enyzme that acts upon it. He has likened the action of enzyme on a substrate to that of a key on a lock. The indications are that enzymes act only on substances having a chemical resemblance to themselves. It appears that the action of an enzyme is limited to a certain arrangement or grouping within the molecule, and a given enzyme will act only upon substances possessing this grouping.

There is much evidence that enzymes in acting upon substances first form temporary compounds with them, these subsequently break down as the substance changes, the enzyme is set free and immediately forms a new union with other molecules of the substance.

Many of the most important enzymes do not exist in the cells in an active form, but are excreted, or zymogens which require activation by the enzymes. These activating agents are called co-enzymes. Thus enterokinase activates trypsinogen and forms trypsin. There is an interesting class of substances which inhibit the action of enzymes, and are called anti-enzymes. Thus in blood serum there exists a substance which destroys the action of trypsin and is known as anti-trypsin; substances can be extracted from intestinal worms which prevent the digestive enzymes from acting. Antiferments are also developed in the blood of animals which have been injected with solutions of enzymes. Whether these anti-enzymes are true enzymes, or whether they act by forming more stable compounds with the enzymes has not been definitely settled.

The methods by which enzymes are formed and their action controlled by

[1] For behavior of enzymes at low temperatures see article by Joseph Samuel Hepburn in this issue.

the cells are not known, but they without doubt form a most important class of agents, through which the chemical operations of life are accomplished. Many of the tissues are abundantly supplied with them. Twenty or more have been shown to be present in the liver. The kidney and muscle tissue are also widely supplied with them.

Among the more familiar processes in which enzymes take a prominent part might be mentioned those of digestion. Here a certain amount of adaptation of secretion to diet seems possible. Lactase, an enzyme present in the intestine of infants, is absent or present in negligible amounts in adults, but constant feeding of lactase results in a revival of its secretion. This adaptability of secretion to diet, may have an important bearing on the ill effects frequently produced by a sudden change in the character of the diet. The oxidizing enzymes have already been mentioned in connection with metabolism. There is one anomaly which finds a probable explanation in a defective enzyme action, namely that of alkaptonuria. Tyrosin and phenyl-alanin, products derivable from protein, are normally completely oxidized in the system, but in alkapton are oxidized only partially to homogentisinic acid. Diabetes may find an explanation in the failure of the glycolytic enzymes of the tissue to oxidize glucose. The clotting of blood, the softening of tissue by pus, the destruction of germs by the leucocytes, rigor mortis, and the softening of tissue by autolysis are familiar illustrations. The formation of urea, of dextrose from glycogen and of glycogen from dextrose, the breaking down of neucleic acid in purins, and the oxidation of the purins to uric acid are other cases, which could be greatly multiplied.

THE BEHAVIOR OF ENZYMES AT LOW TEMPERATURES.*

JOSEPH SAMUEL HEPBURN, A. M., M. S., PH. D.

The influence of low temperatures on enzymes is a subject of growing importance to the chemist, the biologist, and the bromatologist. Problems in this field may be studied from either the potential or the kinetic side; for either the resistance of an enzyme to, or its activity at, low temperatures may be investigated. Various researches, conducted during the last half century, have demonstrated that enzymes survive exposure to low temperatures and also act as catalysts at such temperatures. The reports of these researches are widely scattered in the literature; and frequently the original papers may be obtained for consultation only with difficulty. It is the purpose of this paper, which is based on primary sources, to give a *resume* of our present knowledge of this subject. One section is devoted to the resistance of enzymes to low temperatures, and one to their activity at such temperatures.

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* Communicated by the Author to the *Journal of the Franklin Institute,* and reprinted by permission. This contribution is based on a paper to be published by the writer in the *Biochemical Bulletin,* 1915, iv.

In this paper full details will be given of the researches of various investigators on the influence of low temperatures on enzymes, and a complete bibliography appended.

THE RESISTANCE OF ENZYMES TO LOW TEMPERATURES.

The researches reviewed below demonstrate that the following enzymes survive exposure to low temperatures and again exert their usual catalytic power when brought into a suitable environment: diastase, inulinase, invertase, maltase, zymase, lipase, protease of plants, pepsin, trypsin, thrombin, rennin, oxidase, peroxidase, catalase, simple and aldehyde reductase. This order will be followed in presenting the data.

Solutions of *diatase, inulinase,* and *invertase,* after exposure for forty-five minutes to the temperature of liquid air (approximately —191° C.), retained unaltered their power to hydrolyze starch, inulin, and sucrose, respectively. The diastase was obtained from human saliva and from *Aspergillus niger;* the inulinase from the Aspergillus; and the invertase from both the Aspergillus and beer yeast.

After yeast press juice had been repeatedly cooled to —2° C., its *maltase* retained the power to invert maltose.

Zymase in yeast press juice survives complete freezing of the juice. The enzyme may be concentrated by cooling the juice to —2° C. and removing the ice crystals from the solution of enzyme in the mother liquor. Zymase has been prepared by trituration of a mixture of solid carbon dioxide (carbon dioxide snow)[1] and dehydrated yeast cells for a period of one-half hour. It is resistant to a temperature of —182° to —190° C., that of liquid air; yeast cell plasma, held at that temperature for twenty hours, retained unchanged its power to produce alcoholic fermentation.

The *lipase* of a pig pancreas, which had been kept in cold storage at 4° C. for seven days, retained about forty percent of its power to hydrolyze ethyl butyrate. Lipase was found in fresh eggs which had been held at 0° C. for sixty-six days. It was present in the crude abdominal fat of a chicken kept at 0° C. for twenty-four hours after death, in that of chickens of known history held hard frozen for periods of twelve and one-half, thirteen, sixteen, twenty-eight, twenty-nine, and forty-two months at a temperature of —9.4° to —12.2° C., and in that of birds, whose history prior to freezing was unknown, kept at that temperature for periods of fifty-four and eighty-nine months.

The *protease* of plants survives freezing temperatures. Sprouting wheat seedlings, excoriated peas, excoriated germinating peas, etiolated caulis tops, etiolated leaves and green leaves of the bean *Vicia faba* were frozen, usually for twenty-four hours. Their proteases were still able to produce autolysis of the tissue proteins at room temperature.

Solutions of *pepsin* and *trypsin,* after exposure to the temperature of liquid air (approximately —191° C.) for forty-five minutes, were practically unaltered in their ability to digest albumin.

The clotting enzymes *thrombin* and *rennin* likewise survive exposure to the temperature of liquid air. Thombin of dog's blood held at —180° C. for thirteen minutes retained in full its power to produce clotting of the blood.

Commercial rennet, kept at —180° C. for periods of one, five, ten, and thirty

[1] The temperature of solid carbon dioxide vaporizing at ordinary atmospheric pressure is approximately —75° C. (Richter *Inorganic Chemistry,* Fifth American Edition, p. 228.)

minutes, was entirely unchanged in its action on milk at 35° C. In another experiment a rennin solution, which was kept in boiling liquid air for over one hour, retained completely its power to produce clotting of milk.

Oxidase was present in milk held at 0° C. for as long as thirty-five days, and in cream held at that temperature for as long as twenty-eight days. Both milk and cream were rendered bacteriologically sterile by addition of 0.1 percent of formaldehyde before storage.

Both oxidase and *peroxidase* were found in the crude fat of a chicken kept at 0° C. for fifteen days after death, and in that of hard-frozen chickens, including birds of known history, kept in the freezer for nine months and birds, whose history prior to freezing was unknown, held in the freezer for periods of twenty-three and sixty-three months; the temperature of holding was —9.4° to 12.2° C.

Catalase has been found in milk and cream rendered sterile by addition of 0.1 per cent of formaldehyde and held at 0° C. for twenty-one days. It has also been detected in eggs, including both the white and the yolk, after the eggs had been kept at 0° C. for sixty-five days.

Catalase has also been demonstrated in the crude fat of chickens of known history held hard-frozen for nine months at a temperature of —9.4° to —12.2° C., in sole kept frozen for nineteen to twenty-one days at —2° to —9.5° C., and in cod kept frozen for thirty days at —2° to —6.5° C.

Simple reductase has been found in formalized, sterile milk and cream kept at 0° C. for twenty-eight days; the cream also contained *aldehyde reductase*.

Simple reductase occurred in the crude fat of chickens of known history held hard-frozen for nine months, and in that of chickens, whose history prior to freezing was unknown, kept in the freezer for twenty-three months. Aldehyde reductase was present in the birds of the latter class after periods of twenty-three and sixty-three months in the freezer. The temperature of holding was —9.4° to —12.2° C.

THE ACTIVITY OF ENZYMES AT LOW TEMPERATURES.

Studies have been made of the activity of the following enzymes at low temperatures: invertase, maltase, zymase, diastase, lipase, pepsin, trypsin, galactase, urease, rennin. This order will be followed in presenting the data. At times the enzyme studied was permitted to produce an autolysis, at times to act in solution on an artificial medium, at a given low temperature.

Invertase, maltase, and *zymase* are active at the temperature of an ice-box, for yeast press juice ferments saccharose, maltose, glucose, and fructose at that temperature.

The *diastase* of carp liver acts on starch at 0° C., converting it first into soluble starch, then into erythrodextrin, and finally destroying the latter compound.

The *lipase* of pig pancreas has been shown to hydrolyze ethyl butyrate at 0° C., and to hydrolyze neutral lard at —9° to —12° C. The lipase of pig liver splits ethyl butyrate at 0° C. and at —10° C. The lipase of crude chicken fat produces hydrolysis of ethyl acetate, butyrate, and benzoate and amyl salicylate at 0° C. and at a temperature of —6.7° to —9.4° C.

Pepsin.—The gastric protease of the frog, the pike, and the trout digests albumin at 0° C.; that of the frog also digests fibrin at 0° C., while that of the pike produces proteolysis of fibrin at temperatures as low as 0° C. Pepsin of pig's stomach converts coagulated ovalbumin into acid albumin, albumoses, and peptones at 0° C. Pepsin also digests ricin at that temperature.

Trypsin, derived from the intestinal tract of the carp, gave rise to proteolysis of gelatin and of fibrin at 0° C.

Galactase, the trypsin-like enzyme of milk, gives rise to a proteolysis in Cheddar cheese which is ripened at 15° F. (—9° C.), 25° to 30° F. (—1° to —4° C.), and 33° F. (+0.6° C.). Galactase also produces proteolysis in milk rendered sterile by addition of 0.1 percent of formaldehyde and held at 0° C. The digestion of the proteins observed in milk kept at —9° C. has been ascribed to the action of galactase.

Urease of the soy bean hydrolyzed urea at temperatures as low as 0° C.

When *rennin* acts on milk it first transforms the casein into paracasein and then precipitates the latter compound as a coagulum. The first stage of the reaction occurs at 0° C.; the second stage likewise takes place at that temperature, but the precipitate separates in a finely-divided condition without the formation of a distinct curd.

SUMMARY.

The power to survive prolonged exposure to low temperatures is possessed by various enzymes, including those producing hydrolysis of fats, of carbohydrates, and of proteins, those concerned in biochemical oxidations and reductions, the clotting enzymes and that of alcoholic fermentation. The enzymes retained their catalytic power after exposure, either *in situ* or in solution *in vitro,* to temperatures varying from a few degrees above 0° C. to the temperature of liquid air (—180° to —191° C.). The shortest periods of holding, invariably less than one day and usually less than one hour, were at the temperature of liquid air. The longest period of holding was eighty-nine months at a temperature of —9.4° to —12.2° C.

The activity of certain of these enzymes, including rennin, zymase, and those hydrolyzing fats, carbohydrates, and proteins, has been studied at low temperatures, varying from that of an ice-box to one of —9° to —12° C. While the enzymes produced autolytic digestion or acted on artificial media at these temperatures, the velocity of the reaction was always lessened to a considerable degree.

COMPARISON OF THE PHARMACOPŒIAL METHODS FOR THE DIGESTIVE FERMENTS AND ANIMAL PRODUCTS ADOPTED BY THE DIFFERENT COUNTRIES.*

HOWARD T. GRABER.

In January, 1817, Dr. Lyman Spalding of New York City, submitted to the Medical Society of the County of New York, a project for the formation of a National Pharmacopœia, and on December 15, 1820, the first issue of this national volume was published in Boston, in both Latin and English. There have been eight revisions since this first volume appeared, and the present book stands pre-eminent as a national standard, having been adopted by the United States Department of Agriculture.

Section 7 of the Food and Drugs Act of June 30, 1906, states: "In the case of drugs, if where a drug is sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as determined by the test laid down in the United States Pharmacopœia or National Formulary, official at the time of investigation, it is deemed to be adulterated unless said difference is plainly stated on the label." Nor is the United States alone in its publication of such an official standard; indeed, each nation has its own standard volume. In France they have the French Codex, in Germany the Arzneibuch, in Japan the Japanese Pharmacopœia, and in England and her colonies the British Pharmacopœia, etc.

I shall not attempt a general comparison of these various books, but will confine myself to the requirements of the various governments for the standardization of the digestive ferments and animal products.

The digestive ferments which have received almost universal recognition are pepsin, pancreatin and diastase, and of the allied animal products desiccated thyroid glands, oxgall, both pilular and purified, and peptone have been recognized.

PEPSIN.

Taking up the consideration of the enzyme pepsin, it is found that three nations, namely, the United States, Germany and Japan, evaluate the proteolytic value of this ferment by its digestion on boiled egg albumen; the country utilizing a different proteid being France, which has adopted as a proteid, washed fibrin from pig's blood, strained by hand and desiccated at 40° C., either in a warm closet or in a draught of warm air, then pulverized.

The official strengths vary from 1:400 to 1:3000, and the time of digestion from two to six hours.

The following chart illustrates the essential details of the various tests:

* Read before the Detroit Section of the American Chemical Society.

Country	Pepsin gm.	PROTEID: Egg Albumen: Boiled	PROTEID: Egg Albumen: Amount	PROTEID: Egg Albumen: Texture	Des. Fibrin Amount	Media for Digestion	Time Digested	Temperature	Official Strength	When	Kind Official	Animal Used
U. S. A.	.00333+ gm.	15 min.	10 gms.	Through No. 40 sieve		40 cc. .3% HCl	2½ hours	52° C.	1:3000	Insoluble residue after standing ½ hour does not measure more than 1 cc.	Scale, Grain or Powder	Pig
An Essence of Pepsin N. F., each fluid drachm of which contains 1 grain of 1:3800 Pepsin												
England	.005 gm.	15 min.	12.5 gms.	12 meshes to cm. No. 4		125 cc. .2% HCl	6 hours	40½° C.	1:2500	Only a few small flakes remaining	Grains, Scales, Powder	Pig, sheep or calf
Glycerin of Pepsin, each fluid drachm of which contains 5 grams of official Pepsin												
Germany	0.1 gm. Mixture made by mixing 65 parts by weight of Pepsin and 935 parts by weight of Sugar, pure	10 min.	10 gms.	No. 60 sieve		100.5 cc. .2% HCl	1 hour	45° C.	1:4000 (U. S. P.) 1:1535	Albumen must have dissolved	Saccharated	
Japan	0.1 gm.	About 6 min.	10 gms.	No. 4		100.5 cc. .15% HCl	2 hours	45° C.	1:600 (U. S. P.) 1:100 (J. P.)	Albumen almost completely digested. Moisture not over .5%. Ash not over .5%	Saccharated only	Hog or cattle
France	0.1 gm.			Pulverized	2½ gm. Desiccated pig Fibrin	60 grams .256% HCl	6 hours	50° C.	1:3000 (U. S. P.) 1:600 France	10 cc. of the cold and filtered digested solution should not at the ordinary temperature become cloudy by the addition of 20 drops of HNO_3 (sp. grv. 1.394 @ 15° C.)	Thick paste, powder or scales Amylaceous and Lactated Pepsin	

As to the general physical characters, they all agree that the pepsin should be soluble in water and also alcohol of 20 to 30 percent strength and insoluble in strong alcohol.

PANCREATIN.

Pancreatin, the second enzyme to be considered, is as the name implies, a mixture of the enzymes naturally existing in the pancreas of warm-blooded animals and consisting principally of amylopsin, trypsin, steapsin and myopsin. Of this mixture amylopsin, or the starch digester, and trypsin, or the pancreatic proteolytic ferment, are the only two enzymes which are officially standardized; and the same difference is noted with the methods adopted for trypsin as for pepsin, namely, three of the countries under discussion have adopted cow's milk as the medium for tryptic estimation, while one, France, uses the desiccated blood fibrin from pig's blood.

The chart on the next page illustrates the official methods for determining the tryptic value of a pancreatic product.

Of the animal products recognized are oxgall and thyroid glands; with peptone official in the French Codex only:

OX GALL PURIFIED.

Country	Description	Character of Product	Odor	Taste	Official Tests and Requirements Should be
U. S. A.	Evaporated Gall of Ox	Yellowish Granular soft solid	Peculiar	Partly bitter. Partly sweet.	Completely soluble in water. Completely soluble in 94% alc. Completely soluble in 50% alc. Sulphuric acid identification test.
England	Evaporated Ox Gall	Yellowish Granular Hygroscopic substance	Peculiar	Partly sweet. Partly bitter.	Completely soluble in 90% alc. and water. Also aqueous soln. gives no precipitate upon the addition of 90% alcohol. Usual H_2SO_4 identification test.
Japan	Evaporated Ox Gall				No official purified product. A crude evaporated gall is official with an ash requirement of 8.10% solid residue.
Germany					No official product.
France					No official product.

DESICCATED THYROID GLAND.

Country	Animal	Character	% Composition	Ash	Standard Requirements
U. S. A.	Sheep	Yellowish Amorphous Powder	1 part represents approximately 5 parts of fresh gland	Not over 6%	Qualitative test for presence of organic Iodine, also absence of inorganic Iodine. (9th Revision — .17 — .23% Iodine.)
British	Sheep	Light dull brown powder. Pinkish turbid liquid	100 minims, or 6 cc., represents 1 entire gland		
Japan					No official product.
France					No official product.
Germany					No official product.

PANCREATIN—TRYPSIN ESTIMATION.

Country	Official Product	Amount Enzyme gms.	Amount $NaHCO_2$ gms.	Dissolved in	Amount Milk	Digested at	Time Digested	Requirement to be Official
U. S. A.	Powder	.28	1.5	100 cc. Tepid water	400 cc.	38° C.	30 mins.	Small portion mixed with three times its volume of water and some Nitric acid added should produce no coagulation.
England	Liquid	2 cc.	0.2 gm.	20 cc. Water	80 cc.	45° C.	1 hour	Coagulation should no longer occur upon addition of Nitric acid.
Japan	Powder	.28	1.5	100 cc. Tepid water	400 cc.	38° C.	30 mins.	Requirement same as U. S. P.
Germany								Not official.
France	Powder	0.2 gm.		60 gms. Distilled Water	2.5 gms. Desiccated Fibrin or 10 gms. dried in air.	50° C.	6 hours	Filter:—10 cc. of clear liquor should not become cloudy by the addition of 20 drops of Nitric acid. (Sp. Grv. 1.394 @ 15° C.)

PANCREATIN—ESTIMATION OF AMYLOPSIN.

Country	Amount Ferment	Official Product	Starch grams	Distilled Water	DIGESTED		Iodine Solution	End Point
					Time	Temperature		
U. S. A.	0.3 gm.	Powder	7.5 gms.	200 cc.	5 mins.	40.5° C.	2 drops N/10 I. in 60 cc. water.	Converted into substances soluble in water. Four drops of converted starch solution should give no color, or at most only a wine red when added to the Iodine solution. Under these conditions 1 part pancreatin digests 25 parts of starch.
England								Not official.
Germany								Not official.
Japan								Not official, see Diastase {Japan Pharm. {See below.
France	.05 gm.	Powder	5 gms. Potato	100 cc. Water	1 hour	55° C.		A fluid liquid is obtained which, when filtered, reduces 4 times its volume of Fehling's solution.
DIASTASE.								
Japan	.05 gm.	Powder	5 gms. Potato	100 cc. Water	2 hours	55° C.		10 cc. of digested starch solution should completely decolorize 40 cc. Fehling solution.

The last product to be considered is peptone, and this is recognized by but one nation, namely, France, under the title Peptone Medicinal.

It is official as a pancreatic or peptic digestive product of albuminoids; is almost completely soluble in water, not coagulated by heat nor by the addition of nitric acid; it has a peculiar odor and a bitter taste when made by pancreatic digestion and a bitter and saline taste when made by peptic digestion.

A perusal of the before mentioned variations in the official methods adopted for the standardization of animal products by the various countries, shows that physiological chemists in general have not as yet adopted uniform methods along this line of chemistry. I predict, however, that with the advent of the next issue of the United States Pharmacopœia our foreign neighbors will admit our superiority not only in the manufacture of this important line of pharmaceuticals, but also in their standardization, and will adopt not only our products but our methods as well.

STANDARDIZATION OF SODIUM THIOSULPHATE VOLUMETRIC SOLUTION.*

JOSEPH L. MAYER.

A reference to page 563 of the U. S. P., will show that the official method of standardizing sodium thiosulphate V. S., is to employ a decinormal solution of potassium dichromate proceeding as follows:

"To a solution of about 1 gm. of potassium iodide (Potassii Iodidum, U. S. P.), in 10 cc. of diluted sulphuric acid contained in a flask of about 500 cc. capacity, add slowly, from a burette, 20 cc. of tenth-normal potassium dichromate V. S., shaking after each addition. Place a watch-glass on the mouth of the flask and allow it to stand for five minutes, then dilute the solution with about 250 cc. of distilled water, add some starch T. S., and then, from a burette, the trial solution of sodium thiosulphate, in small portions at a time, shaking after each addition, and, toward the end of the operation, reducing the flow to drops, until the blue color of the mixture changes to a light green; note the number of cc. of the trial sodium thiosulphate solution consumed. Then dilute the sodium thiosulphate solution so that equal volumes of it and the tenth-normal potassium dichromate V. S. will exactly correspond to each other under the above conditions, at 25 deg. C. (77 deg. F.)."

On page 549 of the U. S. P., volumetric iodine solution is directed to be made by the following:

Tenth-normal iodine V. S. may be prepared according to either of the following methods:

"1. Dissolve 12.59 gm. of pure iodine (see below) in a solution of 18 gm. of potassium iodide in 300 cc. of water. Then add sufficient water to make the solution measure, at 25 deg. C. (77 deg. F.), exactly 1000 cc. Unless freshly prepared, its strength should always be determined anew at the time it is used. Transfer the solution to glass-stoppered vials.

Preparation of Pure Iodine.—Heat powdered iodine (Iodum, U. S. P.), in a porcelain dish placed over a bath of boiling water for twenty minutes, and stir it constantly with a glass rod, so that adhering moisture, cyanogen iodide, and most of the iodine bromide and iodine chloride, if present, may be vaporized. Then transfer the iodine to a porcelain or other non-metallic mortar, and triturate it with about 5 percent of its weight of dry potassium iodide, so as to decompose any remaining iodine bromide and iodine chloride. Then return the mass to the dish, cover it with a glass funnel, and heat the dish carefully on a sand-bath. Detach the

* Read before the Kings County Pharmaceutical Society, March 9, 1915.

sublimed, pure iodine, and, after pulverizing and drying for twenty-four hours over calcium chloride, keep it in well-stoppered bottles, in a cool place."

Since N/10 Iodine is the exact equivalent of N/10 $Na_2S_2O_3$, the U. S. P. on page 550 gives as an alternative method of preparing the N/10 Iodine the following:

"Dissolve about 14 gm. of iodine (Iodum, U. S. P.), in a solution of 18 gm. of potassium iodide (Potassii Iodidum, U. S. P.), in about 300 cc. of water, diluting finally to 1000 cc. Of this solution (which is too concentrated), carefully measure from a burette 10 cc. into a flask, then add gradually and cautiously, from a burette, tenth-normal sodium thiosulphate V. S. (shaking constantly) until the color of the solution is discharged. Note the number of cc. of the sodium thiosulphate V. S. consumed, and then dilute the iodine solution so that any known volume of the latter will require for decolorization exactly the same volume of the tenth-normal sodium thiosulphate V. S."

This indicated to me that the factor for $Na_2S_2O_3$ V. S. standardized by either potassium dichromate or resublimed iodine would be the same, and to determine whether such was actually the case the following work was undertaken: A N/10 $K_2Cr_2O_7$ V. S. was made up by the following method on page 551 of the U. S. P. employing Kahlbaum's Salt.

"Dissolve 4.8713 gm. of pure potassium dichromate, which has been pulverized and dried at 120 deg C. (248 deg. F.), (see Reagent No. 85), in sufficient water to measure, at 25 deg. C. (77 deg. F.), exactly 1000 cc."

The $Na_2S_2O_3$ V. S. standardized against this had the factor recorded in tabulation below.

Another lot of N/10 $K_2Cr_2O_7$ made up by the same method using Baker's salt, the same $Na_2S_2O_3$ V. S. had the factor noted below.

Small amounts of Iodine prepared as directed under V. S. iodine were weighed off and after solution in water with the aid of KI employed to standardize the $Na_2S_2O_3$ sol.; the factor is recorded below.

Iodine prepared as directed by the U. S. P. under V. S. Iodine was mixed with KI placed in a small porcelain crucible, heated on a sand bath until copious evolution of iodine fumes. Then one of a set of watch glasses with ground edges, which were tared with a clip, was slipped over the top of the crucible until a sufficient amount of iodine had sublimed; after cooling, the watch glasses, clip and iodine were weighed again. The increase in weight being iodine. The watch glasses and iodine without clip were then put into a few cc. KI solution, and when the iodine was dissolved the $Na_2S_2O_3$ V. S. was run in until the reaction was complete. The factor for the $Na_2S_2O_3$ solution is noted.

Factor employing Kahlbaum's Chemical 1 cc.=.011342 grammes iodine.
1 cc.=.9009 cc. N/10 $Na_2S_2O_3$ V. S.

Baker's Chemical 1 cc.=.011362 grammes iodine.
1 cc.=.9025 cc. N/10 $Na_2S_2O_3$ V. S.

Iodine resublimed on funnel 1 cc.=.011539 grammes iodine.
1 cc.=.91652 cc. N/10 $Na_2S_2O_3$ V. S.

Iodine resublimed on watch glass 1 cc.=.011533 grammes iodine.
1 cc.=.91604 cc. N/10 $Na_2S_2O_3$ V. S.

These results indicate that the use of resublimed iodine gives higher and probably more accurate results than the potassium dichromate method.

I am fully aware of the fact that the potassium dichromate used for standardi-

zation is usually directed to be checked against pure iron as is evidenced by the following citation from page 136, U. S. Dept. Agr. Division of Chemistry, Bul. 107, revised, under the determination of the iodine number of fats and oils.

"*Decinormal potassium bichromate.*—Dissolve 4.9083 grammes of chemically pure potassium bichromate in distilled water and make the volume up to 1 liter at the temperature at which the titrations are to be made. The bichromate solution should be checked against pure iron."

But of course this requires another determination and further complicates the standardization of the $Na_2S_2O_3$ V. S.

In view of the close duplicates obtained by the use of resublimed iodine and simplicity of employing the watch glasses and clip method, I would suggest this as the most satisfactory means of accurately standardizing $Na_2S_2O_3$ V. S.

The sodium thiosulphate solution was made by taking 4 liters of distilled water, boiling until all air and CO_2 were expelled, placing in a large amber-colorded bottle, and when cool, dissolving about 100 grammes of C. P. sodium thiosulphate in the liquid.

The bottle was set away in a dark place until ready for use (about six weeks). When a syphon tube with pinch cock was inserted and a layer of neutral liquid petrolatum placed on top of the liquid, by blowing into a hollow glass tube in the other hole of the rubber stopper the syphon was started.

Making up the solution by using distilled water from which the air and CO_2 are expelled, allowing to stand until decomposition and precipitation has taken place, covering with a layer of liquid petrolatum and syphoning off the quantities of solution required makes an ideal method of handling not only this volumetric solution but very many others, it being our practice to follow this method whenever possible.

RESEARCH AND ANALYTICAL DEPARTMENT RIKER LABORATORIES.

A PROFESSIONAL "SIDE LINE" FOR THE PHARMACIST.*

J. M. ROGOFF, PH. G., M. D.

The introduction into therapeutics, of antitoxins, vaccines, serums, bacterins, etc., and the principles inculcated in the "Therapia Sterilans Magna" with the advent of Ehrlich's Salvarsan and Neo-Salvarsan have had a marked influence upon the prescription department of the pharmacist, and, for self-preservation, he has turned to commercialism and has converted his pharmacy into a miniature department store, instead of taking the more logical and ethical course of preparing to supply the physician with these new therapeutic agents, which have replaced so many of the old ones that at one time made the prescription department most remunerative.

In this paper, I do not aspire to the dubious distinction of originality, but will merely attempt to illustrate that the pharmacist can, with a little additional prepa-

* From a paper read before the Nashville Branch A. Ph. A., February 17, 1915.

ration, and without investment of much money, add to his store a profitable and ethical professional "side line," which will bring him into closer relationship with the physician and improve his prescription patronage indirectly, as well as partly remunerate him for the loss of some of the prescription work that has been replaced by the use of other agents.

The modern pharmacist can easily equip himself with the necessary knowledge and apparatus to do for the physician, the simpler chemical tests that are used in clinical diagnosis, i. e., ordinary urine analysis, gastric analysis, etc.

Believing that the practice of such a side line by the pharmacist would be a step in the progress of advancement of the profession, I will present to you this paper, which if met by your approval will be followed by other similar papers that might constitute an introductory course of instruction, which if added to the pharmacist's knowledge of chemistry and chemical technique, will aid you to perform these tests, and thus legitimately serve the physician and the public in an ethical manner.

In this paper, microscopical tests are not included, being limited to the chemical tests that can be performed by any intelligent pharmacist.

The apparatus and the reagents required for this work are simple and inexpensive and most of them are found in every pharmacy. The following apparatus is sufficient for most of this work: Burette and holder, pipettes, beakers, funnels, test tubes, sedimentation glasses, evaporating dishes, Bunsen burner or alcohol lamp. The reagents will be mentioned with the various tests.

I will consider the analysis of the gastric contents to begin with. The physician desires a qualitative and quantitative analysis, and I will group the easily performed tests into these two subdivisions.

A. Qualitative tests:

1. Quantity, odor, appearance (blood, pus, undigested food, mucus, etc.).
2. Reaction: Litmus test.
3. If reaction is acid, determine if acidity is due to free acids: Topfer's reagent (one percent alcoholic solution of dimethylamidoazobenzol) is most commonly employed; this gives a red color, if free acid is present.
4. If free acid is indicated, determine if this is mineral (hydrochloric) or organic (lactic):

GUENZBERG'S REAGENT.

Phloroglucin	1 part
Vanillin	2 parts
Alcohol	100 parts

A few drops of this reagent mixed with ½ to 1 cc. of filtered gastric juice and evaporated in a porcelain capsule will produce a red color as the mixture evaporates, (avoid excessive heat) if free mineral acid is present.

BOAS' REAGENT.

Resorcin	10 parts
Cane Sugar	5 "
Alcohol	5 "
Water, q. s.	100 "

This reagent is used as Guenzberg's, and the results obtained are similar if free mineral acid is present.

5. Organic Acid:—(lactic) Uffelmann's Reagent (2½% aqueous solution until the mixture becomes of an amethyst color). A few cc. of gastric contents are added to about 5 cc. of the reagent in a test tube, and if organic acid is present, a yellowish color will replace the bluish color; if mineral acid is present, a colorless solution will result. Therefore, if free mineral acid has been found to be present by test number 4, it is necessary to separate the organic to properly perform this test; this can easily be accomplished by shaking the gastric contents (a few cc.) with ether, which will extract the organic acid away from the mineral acid, and when the etherial layer is evaporated (spontaneously) the residue can be dissolved in distilled water and Uffelmann's reagent applied.
6. Starch: Iodine solution, or Lugol's solution (a few drops) gives a blue color.
7. Erythrodextrin: Iodine solution, or Lugol's solution, gives a reddish color.
8. Maltose: Fehling's, or Haines' solutions (a few cc.) boiled with a few cc. of the gastric contents will be reduced and a heavy reddish or reddish brown precipitate will appear.
9. Propeptone: a. Primary proteoses are precipitated by one-half saturation with ammonium sulphate.
   b. Secondary proteoses are precipitated by complete saturation with ammonium sulphate.
10. Peptone: The Biuret Test: This is performed by the addition of dilute cupric sulphate solution, then adding NaOH or KOH solution in excess (i. e., until distinctly alkaline) a pink color indicates peptone, violet indicates other soluble proteins. This reaction is sometimes enhanced by the aid of slight heat.
11. Pepsin: A few shreds of freshly, coagulated egg albumen are added to a few cc. of (acidulated to 0.4%) gastric contents and its digestive quality noted.
12. Rennin: 5 cc. of gastric content should completely curdle about 15 cc. of milk in from about 10 to 15 minutes, when kept at incubation temperature.

B. Quantitative tests.

1. Free HCl: Titrate with N/10 or N/20 NaOH, using Topfer's reagent as an indicator.
2. Combined HCl: Titrate with N/10 or N/20 NaOH, using alizarin as an indicator, then deduct the results of this titration from the total acidity.
3. Total Acidity: Titrate with N/10 or N/20 NaOH, using phenolphthalein as an indicator.
4. Organic Acids: Extract a known quantity of gastric content with ether, then titrate the residue for total acidity; this result deducted from the total acidity before extraction of the organic acid with ether will indicate the quantity of organic acid.
5. Pepsin: Digestive influence on Mett's tubes.

A POSSIBLE SOURCE OF ERROR IN SOME ALKALOIDAL ASSAYS.*

P. A. W. SELF, B. SC., F. I. C.

A short time ago, as the result of an accident, my attention was directed to the interaction which, in favorable circumstances, may take place between free alkaloids and ammonium salts, and to the error which may arise from this cause in alkaloidal assays where the alkaloid is titrated. Although there does not appear to be any probability that a capable and experienced analyst ever falls a victim to this possible source of error, yet it appears quite worthy of notice, since it is certainly not generally recognized, while, at the same time, it may easily produce serious inaccuracies in the work of any one who is somewhat inexperienced in alkaloidal determinations.

That certain of the alkaloids have the power of expelling ammonia from its salts is fairly well known, but it does not appear to be equally well known that probably this power is possessed—to some extent and in suitable circumstances—by nearly all alkaloids. Ammonia, it is true, is a much stronger base than most fixed alkaloids, but its great volatility largely counterbalances this fact, for it is a matter of common knowledge that a feeble base or acid is capable—in conditions allowing interaction—of expelling from combination a much stronger member of its class, if the former is fixed and the latter volatile, at the temperature employed. A good example of this is given by the process of glazing earthenware, where, at the high temperature used, the extremely feeble acid, silicic acid, is able to decompose sodium chloride, with formation of sodium silicate, and expulsion of the very strong (but volatile) acid, hydrochloric acid.

Now, in an alkaloidal assay, if the alkaloid is liberated by *ammonia* and the volatile solvent employed in the final shaking-out is not washed with water, but is run directly into a dish and evaporated, there is considerable danger of a small volume of the aqueous layer (containing an ammonium salt) being carried into the dish with the alkaloid. This may happen in two ways: in the first place, by carelessless in the separation of the two layers of liquids, and, secondly, by a little of the ammoniacal solution clinging to the sides of the separator being carried down mechanically by the friction of the issuing stream of solvent; in either case, during the final stage of the evaporation, we have in the dish free alkaloid in contact with a solution of ammonium salt. The natural result is that, as pointed out above, a certain amount of interaction takes place (the extent of this being dependent on several circumstances), with consequent loss of ammonia and formation of an alkaloidal salt. The residue finally obtained, therefore, consists of a mixture of free alkaloid and alkaloidal salt, and the titration, of course, only gives the amount of the former.

It is interesting to note that here the result obtained is *too low*, whereas when the alkaloid is not titrated, but *weighed*, the introduction of ammonium salt causes the result to become *too high*. The error in the case of titration may,

* The Pharmaceutical Journal and Pharmacist, May, 1915.

however, be much more serious than when the alkaloid is weighed, since owing to the high molecular weights of all alkaloids, a very small quantity of a salt of ammonia is capable of causing the neutralization of a comparatively large weight of free alkaloid if interaction is complete. Thus one part of ammonium chloride will interact with 12 parts of aconitine, 5.4 parts of atropine, or 6.3 parts of strychnine.

In order to ascertain the degree of error which may result from the cause under consideration, in alkaloidal assays, a number of quantitative experiments were made, with the following results:

In the first series of experiments, weighed amounts of pure alkaloids were dissolved in a little chloroform or ether, a small quantity of a weak solution of ammonium chloride added, and the whole evaporated to dryness on a water-bath and titrated in the usual way. In each case a similar experiment was performed, in which the ammonium chloride was omitted, in order to eliminate any other error and check the purity of the alkaloid.

The results obtained, together with fuller details of each individual experiments, are given in Table I.

It will be seen from the Table that the interaction was greatest in the case of atropine, the reaction being practically complete in both experiments. With aconitine the larger amount of apparent loss in the second experiment was probably due to the use of ether causing better contact between the reacting substances than when chloroform was employed, a result which might very well be expected. Strychnine gave least interaction, this no doubt being due to its extreme insolubility in water rendering contact with the ammonium chloride very difficult. In all the experiments, however, considering the minute quantities of ammonium chloride used, the apparent loss of alkaloid was comparatively large.

TABLE I.

Alkaloid Used	Details of Experiment	Amount Taken	Amount Found by Titration	Apparent Loss
Atropine ...	Alkaloid dissolved in 5 mils of ether, and about 4 milligrammes of ammonium chloride in 1 mil of water added.....	0.0189 gm.	0.0243 gm.	0.0246 gm.
Atropine ...	Alkaloid dissolved in 5 mils of chloroform, and about 2 milligrammes of ammonium chloride in 0.5 mil of water added	0.0451 gm.	0.0333 gm.	0.0118 gm.
Aconitine ..	Alkaloid dissolved in 3 mils of chloroform and about 4 milligrammes of ammonium chloride in 1 mil of water added	0.0925 gm.	0.0839 gm.	0.0086 gm.
Aconitine ..	Alkaloid dissolved in 10 mils of ether and about 2 milligrammes of ammonium chloride in 0.5 mil of water added.....	0.0502 gm.	0.0336 gm.	0.0166 gm.
Strychnine..	Alkaloid mixed with 3 mils of chloroform and about 8 milligrammes of ammonium chloride in 2 mils of water added	0.0956 gm.	0.0809 gm.	0.0147 gm.
Strychnine..	Alkaloid mixed with 10 mils of ether and about 2 milligrammes of ammonium chloride in 0.5 mil of water added.....	0.0479 gm.	0.0451 gm.	0.0028 gm.

A few assays of belladonna leaves were next carried out, using the method of the present Pharmacopœia (Br.), but in some experiments washing the chloroform used in the final extraction, with water, and in others allowing small quantities of the aqueous layer to pass into the dish with the alkaloids. The method adopted for the purpose of eliminating any possibility of variation in the first stages of the assay, in comparative experiments, was as follows:

Fifty grammes of the powdered leaf were taken, the extraction with ether-chloroform and shaking-out with acid performed with five times the pharmacopœial quantities of all the reagents, and the acid extract then made up to 250 mils; 50 mils of this liquid were taken for the final stage of each separate experiment, and the exact volumes of chloroform prescribed by the Pharmacopœia used in shaking-out. Three samples of leaf were employed, and the circumstances were varied, as described in Table II.

In experiments (3) and (4) the separation of the chloroform was done with great care, the only aqueous liquid carried into the dish being that unavoidably removed from the sides of the separator by friction, as explained above; the results are, however appreciably low. In experiments (6), (7), and (9), small quantities of the aqueous layer (containing, of course, some ammonium sulphate) were added intentionally, the other circumstances being the same as in experiments (3) and (4), and in all three cases the errors produced were very serious. It is worthly of note that in this assay the fact that ether is added to the alkaloidal residue and then evaporated off again appears to increase any error due to the presence of ammonium salt by promoting better contact, since the apparent loss in experiment (9), where no ether was used, was comparatively much smaller than in experiment (6).

TABLE II.

Number of Sample	Number of Expermt.	Circumstances of Experiment	Percentage of Alkaloid Found	Error
I.	1	Chloroformic solution of alkaloid washed with water	0.295	—
	2	Chloroformic solution of alkaloid washed with water	0.289	—
	3	Chloroform run very carefully into dish without washing	0.278	0.014
	4	Chloroform run very carefully into dish without washing	0.278	0.014
II.	5	Chloroformic solution of alkaloid washed with water	0.402	—
	6	As expts. (3) and (4), but about 0.3 mil. of aqueous layer run into dish in addition	0.197	0.205
	7	As expt. (6), but 0.5 mil. of aqueous layer added	0.191	0.211
III.	8	Chloroformic solution of alkaloid washed with water	0.278	—
	9	As expt. (6), but 0.25 mil. of aqueous layer added, and alkaloid not treated with ether finally	0.208	0.070

It is therefore quite evident, from the figures obtained in both sets of experiments, that in any alkaloidal assay in which the alkaloidal residue is titrated great

care must be exercised to avoid the introduction into the latter of even as little as 1 milligramme of an ammonium salt—that is to say, it is extremely advisable to wash the solution of alkaloid in volatile solvent with water.

From this point of view it is somewhat unfortunate that in the pharmacopœial assay processes for belladonna leaf and tincture and dry extract of belladonna no directions are given for washing the chloroformic solution of alkaloid before evaporation and titration, while it is certainly very difficult to understand why the precaution which was omitted in these cases should have been taken in the assay of liquid extract of belladonna. With regard to aconite and its preparations, while the prescribed filtration of the ether, if properly carried out, appears to render any appreciable error unlikely, yet great care must be taken that none of the aqueous layer passes through the filter, otherwise owing to the high molecular weight of aconitine, a very serious error may result.

THE VARIATION CLAUSE OF THE FOOD AND DRUGS ACT.*

SOME REASONS FOR THE EXISTENCE OF THE CLAUSE AND AGAINST ITS REPEAL.

J. H. BEAL, URBANA, ILL.

Section Seven of the Federal Food and Drugs Act declares that a drug shall be deemed to be adulterated if, when "sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as laid down in the United States Pharmacopœia or National Formulary official at the time of investigation."

To this declaration the so-called variation clause is attached in the form of a proviso which reads, *"Provided,* That no drug defined in the United States Pharmacopœia or National Formulary shall be deemed to be adulterated under this provision if the standard of strength, quality, or purity be plainly stated upon the bottle, box or other container thereof, although the standard may differ from that determined by the test laid down in the United States Pharmacopœia or National Formulary."

The meaning of the foregoing somewhat involved pharaseology is, in brief, that when a title found in the United States Pharmacopœia or National Formulary is used without qualification or explanation, the article sold thereunder must be of strictly U. S. P. or N. F. quality, but that such a title may be used (under the proviso) upon an article of a different standard if the label plainly indicates the standard to which it conforms.

Identical or very similar provisions are found in many of the state food and drug acts, so that arguments for or against the existence of the variation clause of the Federal law will have equal application to state laws.

In view of the fact that the repeal of the variation clause has been demanded upon the ground that it permits the sale of inferior and adulterated products under official titles, it may be profitable to consider some of the reasons which

* Read before the Division of Pharmaceutical Chemistry of the American Chemical Society, New Orleans, April 2, 1915.

lead to its inclusion in the law, and also some of the reasons why its repeal would work unnecessary hardship to the chemical arts and industries and be inimical to the legitimate interests of pharmacy and medicine.

(1) *The Pharmacopœia is a book of limited standards properly applicable to drugs and chemical products only when used in pharmacy and medicine.*

The purpose of the food and drug laws is to prevent fraud and deception in the sale of drugs and medicinal products, not to limit the proper activities of manufacturing pharmacists or chemists or to restrict the trade in chemical or medicinal products within narrow, specified channels.

The Pharmacopœia appropriates titles previously devised and generally used in the arts and industries and attaches to them special meanings and limitations which, though sufficient for pharmacopœial processes and purposes, are not practicable when applied to substances used in the chemical arts and industries in which by far the large proportion of such substances are consumed.

The Revision Committee of the Pharmacopœia in standardizing these substances standardizes them solely for medicinal purposes or for use in the official formulæ and processes. Many of them have other and important uses outside of pharmacy and medicine, and it would be monstrous if the Pharmacopœia by the adoption of well known and commonly used titles could thereafter prevent their use in connection with products to which they had always been attached unless such products were modified to fit the pharmacopœial standards.

The framers of the official standards have themselves recognized the unfitness of these standards for commercial and technical purposes by the specific declaration in the preface to the Pharmacopœia that, "The standards of purity and strength prescribed in the text of the Pharmacopœia are intended to apply to substances which are used solely for medicinal purposes, and when professedly bought, sold, or dispensed as such."

The openly alleged purpose in making the variation clause a part of the Food and Drugs Act was to give legal force and effect to this declaration from the preface to the Pharmacopœia. Consequently, the repeal of the variation clause at this time could hardly be interpreted in any other light than as showing the intention of Congress to reverse its former action, and to make of universal application the words of the statute that an article shall be deemed to be adulterated if, "when sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as laid down in the United States Pharmacopœia or National Formulary official at the time of investigation."

(2) *The variation clause is essential to the utilization of certain natural products in a perfectly proper and legitimate manner.*

Certain alkaloid-bearing drugs are properly required by the United States Pharmacopœia to contain specified percentages of their respective alkaloids when dispensed as medicines or when used in the preparation of official tinctures and fluidextracts. Nature, however, does not always supply drugs which contain exactly the specified content of alkaloid. Sometimes the percentage is below and sometimes above the official specifications, and a drug which is too strong is just as much illegal as one which is too weak.

While such drugs are unfitted for medicinal use in their natural condition,

they can be brought to the proper strength by grinding and mixing those which are above with those which are below the official requirements, or they can be utilized for the manufacture of the free alkaloids. These are perfectly proper and legitimate uses of such drugs, but in the absence of a variation clause in the Food and Drugs Act they could not lawfully be imported or transported in interstate commerce for these purposes.

(3) *The restriction of medicaments to one particular standard which could not be varied from under any circumstances, would be an unwarranted interference with the freedom of choice of medical practitioners who might prefer a different standard.*

Physicians and schools of medicine are by no means in accord as to the best forms of particular medicaments, and forms which are preferred by certain schools are condemned by others. The only proper condition of the law is one which will permit each physician to purchase or to prescribe that which in his judgment is the best.

For example, the Spirit of Nitrous Ether was formerly prepared by the action of nitric acid on ethyl alcohol in the presence of metallic copper, whereas the present official process requires it to be made by reaction between ethyl alcohol, sodium nitrite and sulphuric acid. Rightly or wrongly, many physicians insist that the old process yielded a spirit containing different by-products and therapeutically much superior to that produced by the present method of manufacture, and such physicians will not knowingly use a preparation made by the formula now official.

There can be no good reason why those who prefer the older product should not be permitted to have it, nor can there be any good reason why it should not be dealt in under a label which shows plainly that it was prepared according to the method formerly official.

Numerous other instances might be cited, where special forms of preparations preferred by particular physicians or particular schools could not be lawfully dealt in under their proper titles were it not that the variation clause makes them legal when they are appropriately labeled to show their variation from the present pharmacopœial standard.

(4) *The insistence upon an invariable standard which under no circumstances could be departed from requires the unwarranted assumption that the present official standards are perfect standards, and would operate to delay the introduction and use of improved and superior therapeutic products.*

A new revision of the Pharmacopœia is issued approximately every ten years, and each revision shows many changes from the standards formerly official. Many, or perhaps most of these changes are proved to be necessary by experiments made and published long before the new volume appears, or even before the Revision Committee has been selected. By virtue of the variation clause the superior products resulting from the adoption of these changes are immediately available in commerce by the simple expedient of labeling them so as to show that they conform to a different standard.

Examples of improvement produced by changes in official formulas are found in the newer liquid preparations of the so-called heart-tonic series of drugs of which digitalis is typical. When the eighth decennial revision of the Phar-

macopœia appeared in 1905, no acceptable method of standardizing the preparations of these drugs had been worked out. Since that date, however, several fairly reliable methods of physiological standardization have been developed, by means of which it has been fully determined that the use of a stronger alcoholic menstruum will yield a product which is not only initially more active, but one which will deteriorate much less rapidly than one made with the official menstruum. The fortunate inclusion of the variation clause in the food and drug laws permitted these greatly superior products to become immediately available, whereas without this saving clause they could not have been marketed, except under new and unfamiliar titles, until after the publication of the ninth revision of the Pharmacopœia, which will probably appear some time during the present year.

A large list of other preparations might be named in which modifications of official formulas yield improved products, the superiority of which is attested by the fact that the modifications are later approved and adopted by the Revision Committee. In the majority of instances the new preparations involve the employment of more costly materials or of more expensive processes of manufacture, so that the changes are not suggested by a desire to debase or cheapen the products, but solely by the desire to provide the medical profession with more efficient therapeutic agents.

(5) *The repeal of the variation clause would make it impossible for the owner of a stock of drugs and chemicals to dispose of them in a lawful manner when the standards of the Pharmacopœia are altered.*

Sometime during the present year a new Pharmacopœia will become official, and will show some hundreds of changes from the standards now in force, which means that some hundreds of items of an ordinary drug stock will suddenly become illegal if offered for sale under their titles as these will appear in the new book. These articles were in full compliance with the legal standards when made or purchased, and without any act or fault of their owners have been converted into adulterated products by the change in standards.

A legitimate demand for the articles conforming to the former standard will still exist, but only by virtue of the continuance of the variation clause in the law will it be possible to dispense them under proper labels showing the standard to which they conform.

(6) *The abuses claimed to be due to the existence of the variation clause can be largely, if not entirely cured by a proper interpretation of the variation clause.*

The principal offense charged against the variation clause is that it permits the marketing of so-called grocers' drugs, as ammonia water, hydrogen peroxide solution, spirit of camphor, etc., of inferior quality by the device of stating their percentage strength upon the label, and that the purchaser is deceived for lack of knowledge as to what a proper preparation should be.

The fault here, however, is in permitting the use of a label which does not fully comply with the requirement that the "standard of strength, quality, or purity" shall be *"plainly stated"* on the label.

The clear intendment of the law is that a drug of other than U. S. P. or N. F. quality shall show upon its label the information necessary to enable a purchaser to form an intelligent judgment of its quality or purity, either by direct

reference to another standard or by statements which of themselves sufficientaly indicate its quality and purity.

What such statements would need to be must, of course, vary with the nature of the product and with the character of the persons to whom addressed. When placed upon products intended for use by trained chemists and pharmacists, statements indicating percentages of important constituents, or the activity of the preparation for certain purposes, would be sufficient to convey all the needed information, while in the case of articles intended for popular purchase and consumption some additional or different statements might properly be regarded as necessary.

This is an interpretation that I think the courts would recognize as being in accord with the spirit of the enactment, and one that if enforced will effectually protect the innocent purchaser against intentional fraud and deception.

STATE ANTI-NARCOTIC LAWS.

M. I. WILBERT.

The enactment of the Federal anti-narcotic law, December 17, 1914, has suggested to many the desirability of bringing about greater uniformity in state anti-narcotic laws and in a number of states bills have been introduced that are designed to bring the requirements of the state law into accord with the present Federal law.

While greater uniformity in laws designed to restrict the sale and use of narcotic drugs is no doubt desirable, there are several points that may well be considered by pharmacists before they undertake to endorse any one of the proposed uniform state anti-narcotic laws modeled after the Federal law of December 17, 1914.

Not the least important of these several points is the fact that the Federal anti-narcotic law, quite unlike the Federal food and drugs act, is applicable and is now uniformly in force in all parts of the United States and is by no means restricted, as is the food and drugs law, to Federal territories and to interstate traffic.

With this fact in mind it would be manifestly unnecessary to re-enact in the several states any part or all of the Federal anti-narcotic law. Such enactment would only tend to duplicate the penalties that might be imposed on a person for not complying with the law, as conviction under one law would make the same person guilty or amenable under the other.

An article published in Public Health Reports for March 26, 1915 (page 893-923), presents a comparative analysis of the more important requirements embodied in the existing Federal and state laws that are designed to restrict or to regulate the distribution and use of opium, coca and other narcotic or habit-forming drugs. This analysis shows that even at the present time a number of the state laws include requirements similar to those embodied in the Federal law and to this extent duplicate that law and subject the individual found guilty of non-compliance to double punishment. On the other hand the existing state laws,

in some instances at least, are more comprehensive than is the Federal law, and for this reason it would be unfortunate indeed to repeal all of the existing laws or to restrict in any way the possible influence for good that may be embodied therein.

Future state legislation should be primarily designed to elaborate or to augment the present Federal law by reasonable exercise of the state police powers. To do this it will be above all necessary to restrict the prerogatives or privileges of persons who may be licensed under the Federal act as pharmacists, physicians, dentists, veterinary surgeons or chemists and to define in clear language the rights and limitations of hospitals and sanitariums to use or distribute the proscribed drugs. The state should also restrict the distribution, sale and use of dangerous drugs not already included in the Federal law. The desirability of the latter feature is evidenced even at the present time by the fact that no fewer than eighteen states restrict the sale and use of chloral and its derivatives, while four restrict the sale and use of cannabis indica, both drugs that may be used to produce deleterious habituation or intoxication.

The legitimate objects of a state anti-narcotic law, from this point of view would be:

A further restriction of the articles that may be sold without providing a satisfactory record;

Some reasonable form of definition as to the rights and privileges of practitioners of pharmacy, medicine, dentistry, and veterinary medicine;

A requirement for the prompt reporting of habitual users of any of the enumerated drugs;

Reasonable provisions for the committing of habitual users of habit-forming drugs to public institutions, where they will be properly taken care of;

Provisions for the revocation of licenses to practice pharmacy, medicine, dentistry, or veterinary medicine that may be held by habitual users of habit-forming drugs;

Provisions for the revocation of the license to practice any one of the above-named professions, after conviction under the Federal or state laws designed to restrict the sale and use of narcotic drugs; and finally

Satisfactory provisions for enforcing the several requirements embodied in the law.

A law of this type would of necessity be primarily designed to safeguard public health and its enforcement should therefore preferably be entrusted to the State Department of Health, providing an appropriation is made to secure a sufficient number of inspectors or agents necessary to enforce the provisions of the act.

The penalties imposed should be sufficiently severe to make violation of the law a matter of serious consequence and should for the second offense, at least, include the possibility of imprisonment in the discretion of the court.

Efforts to restrict the use or abuse of drugs that constitute a menace to the future welfare of our American people are generally admitted to be among the more serious problems confronting the citizens of this country at the present time. As pharmacists, we should not forget that we are by law entrusted with the distribution of these drugs and it is incumbent on us to make all reasonable efforts to safeguard their sale and eliminate as much as possible all illicit traffic in drugs

of this type. We pharmacists should not forget that unless we collectively and individually make strenuous efforts to convict the guilty, we as members of the drug trade, must suffer by being held in part responsible for the harm that may be done to the community at large.

UNIFORM STATE NARCOTIC LEGISLATION.*

CHARLES WESLEY DUNN.

In considering the form of a uniform state narcotic law the first problem for solution is the extent of its scope. It is fundamental that the obligation imposed upon the persons affected by this law should not be duplicated in the state law to the extent that two sets of records or two different acts will be required to satisfy a similar requirement, Federal and state. In view of the fact that the Federal law relates to all commerce, both interstate and intrastate, should the states leave the entire field of the regulation of commerce to the Federal law and only include additional and supplemental provisions of a police character? We believe that this question must be answered in the negative for the following reasons, viz.: First, and principally, and as the practical reason, the states will not be denied a very important exercise of their police power. They will not be content to leave the regulation of the commerce in narcotic drugs solely to the Federal Government. We believe that any propaganda along this line would be resented and futile, and therefore, not wise. Second, this duplication of law and enforcement is inevitable under our own system of national, state and municipal regulation, and is general at the present time. Uniformity and harmony of such regulation is the object to be sought, in order that no conflict in such regulation may exist and no unnecessary or undue provisions may be included. Third, and providing always that the Federal and local regulation is uniform and harmonious, the additional state regulation insures greater efficiency and breadth of enforcement. Duplication of penalty under similar Federal and state laws is not a substantial basis for criticism. For, after all, a uniform and effective law necessary in the public interest and fair and just in application is a proper subject for state enactment. Fourth, and finally, it should be considered that, while the state cannot, constitutionally, void the operation of the Federal law by conflicting provisions, yet it may supplement the Federal law and occupy a ground beyond that circumscribed by Congress in the Federal law. These supplemental provisions will not only relate to matters not included in the Federal law, of a police character, such as the treatment of habitual users, but will, also, supplement to a greater or less degree, the Federal provisions regulating the commerce in these drugs. The history of the existing and proposed narcotic legislation to date substantiates the soundness of these reasons.

It is our opinion, therefore, that a uniform state narcotic law should be com-

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plete in itself and its scope should only be limited by the extent of the provisions deemed necessary and advisable to be included therein.

We now have to indicate several fundamental considerations which should, we believe, be held in mind in the drafting of a uniform state narcotic law:

(a) A uniform state narcotic law, as the name implies, should be in entire harmony with the Federal narcotic law. The record and official order form requirements, etc., of the Federal law, so far as they go, should be accepted as satisfactory under the state law. It is perfectly obvious that it is placing a needless and unwarranted burden upon the medical and pharmaceutical professions to require two different official order forms and two different and distinctive sets of records, Federal and state.

(b) A uniform state narcotic law should contain no state compulsory registration and taxation provisions for the reason that such provisions would be needless and unwarranted. The revenue form of the Federal narcotic law was only adopted by Congress in order to permit, constitutionally, the reaching of all commerce, impossible under an interstate commerce act. No such reason exists in the states. The registration information under the Federal law is open to the state officials. Such special taxation laws relating to foods and drugs enacted by the states are not, we believe, and generally speaking, equitable. The general funds of the several states should be used for the administration of these laws. We do not believe it advisable to provide in a uniform state narcotic law that only those persons who have registered under the Federal law may deal in and prescribe these drugs under the state law, because of possible constitutional questions which might thereby be raised, and for a very sufficient reason that such a limitation is entirely unnecessary. Every person who is legitimately dealing in or prescribing these drugs must register under the Federal law and no one else may so register.

(c) A uniform state narcotic law should follow the wording of the Federal narcotic law, so far as possible, in the interest of identity, clarity and simplicity. The development should always be toward the amendment of the Federal law, where such an amendment is advisable, as the law of the land, rather than toward building up state legislation without further reference to the Federal law. This is the general principle we believe should be followed so far as possible. Doubtless there will be sufficient reasons for instituting certain requirements first through the medium of state legislation. Certain other provisions of a police or local character will always be the special and exclusive province of the states.

(d) A uniform state narcotic law should include supplemental police provisions in the public interest. The following provisions might well be considered:

1. The regulation of the treatment of the habitual users of these drugs, including a provision for committal to some suitable institution, where such committal is in the public interest. The legitimate medical treatment of narcotic habitues should be affirmatively recognized and approved. It does not appear to be in the public interest or in the interest of humanity to search down these unfortunate individuals as criminals and a public menace and to arbitrarily confine them in institutions, and to arbitrarily cut off their supply of narcotics. Is not this rather

a medical question, to the larger degree, which must be so determined? We believe that it would be a fair and effective requirement to provide for a clinical record of the disposition of narcotic drugs to an habitual user, which record shall be open to the inspection of the State Board of Health. That the disposition of these drugs to habitual users for any other than a medicinal purpose should be prohibited. That due provision should be made for the medical treatment of such persons and for commitment to some suitable institution, public or private, where such commitment is deemed advisable in view of all the circumstances. The commitment provisions should be carefully circumscribed to provide against their abuse.

2. Provision should be made for the liability to the revocation or suspension of his license by a licensed physician, dentist, veterinary surgeon, nurse, or registered pharmacist, who is addicted to the use of these narcotic drugs in a manner contrary to the public welfare or who has been convicted of such a violation of this law that such revocation or suspension would be in the public interest. In keeping with the seriousness of such a revocation or suspenstion due provision should be made to properly protect the legitimate rights of the person charged, by providing for a fair hearing on a reasonable notice and, further, by providing for an appeal to a court of competent jurisdiction for a review of the sufficiency of the evidence on which the revocation or suspension was based.

3. Provision should be made to prohibit the false and fraudulent issuing or altering of a prescription or order for the purpose of avoiding the provisions of this law and to prohibit the false and fraudulent assumption of the title or name, in any manner, of a physician, dentist, veterinary surgeon or registered pharmacist, or the posing as a legitimate dealer in order to avoid the provisions of this law.

Other similar police provisions will, no doubt, be found advisable. We have only the time now to briefly indicate a few suggestions. We do not refer to the provisions included in the Federal law and regulations against the refilling of prescriptions, etc., which should be included, as a matter of course, in a uniform State narcotic law.

We believe that a uniform State narcotic law should exempt, as should, also, the Federal law, derivatives, preparations and manufactures of the affected narcotic drugs which do not possess narcotic or habit-forming qualities.

It would not appear to be necessary to include a special provision regulating the commerce in hypodermic needles and syringes, for the reasons that an effective regulation of the commerce in the narcotic drugs of themselves would include the legitimate use of the instruments by which they are administered. This expression of opinion is subject to correction if such regulation would not be sufficient.

Provisions relating to opium for smoking purposes and to the smuggling of these drugs into public institutions should be the subject of special and separate legislation.

The Federal narcotic law relates to opium and coca leaves, their manufactures, salts, derivatives and preparations. Several of the State laws relate, in addition, to chloral hydrate, cannabis indica, cannabis sativa, etc. It is certain

that no State should be asked or would be expected to eliminate these drugs from the existing laws, if their regulation is in the public interest. If there is a general need for such regulation the Federal law should be so amended. If there is a local need the local law should be maintained. Again, in several states, there are exceedingly strong special laws, such as cocaine laws. The advisablity of disturbing these laws where no question of uniformity is involved would be questionable. Here, again, local conditions are a factor for consideration.

These and other problems will have to be met in the preparation of a uniform State narcotic law, which law will, no doubt, have to be remolded to a greater or less extent in respect to matters purely local and where no question of uniformity is involved. The purpose of such a uniform State law would be to provide certain uniform fundamental provisions, to raise the local law in each locality to the highest degree of efficiency, to eliminate unnecessary or unwarranted provisions, and, then, to leave to the individual states the solution of purely local questions.

That there is a need for a uniform state law will be apparent from an examination of the existing State narcotic laws, with their diversity and conflict of provisions. The problems underlying State narcotic legislation involving social, economic, medical, penal and general public welfare considerations, are so important and their proper solution so entirely in the public interest, that such an intelligent and co-operative study thereof and final expression in a uniform law cannot but prove distinctly valuable. State narcotic legislation will now be an important and active subject for consideration by the legislatures of the several states. Many well intentioned but ill-advised suggestions will be made. The value of general uniformity will perhaps be lost sight of. It behooves, therefore, the medical and pharmaceutical professions to give careful and thoughful attention to the subject of uniform State narcotic legislation. A uniform law has already been suggested by the Chamber of Commerce of the United States of America, through its committee on uniform food and drug regulation, and by the National Association of Retail Druggists. The enlightened and public spirited co-operation of the medical and pharmaceutical professions in such beneficent matters reflects its greatest credit upon them. The Society of Medical Jurisprudence is peculiarly positioned and equipped to seriously and actively study this important problem to the end that an effective uniform state narcotic law may be enacted which will best serve the interests of the public, and the legitimate interests of the pharmaceutical and medical professions.

A special committee on narcotic legislation has been appointed by the president of the Society of Medical Jurisprudence, consisting of Charles Wesley Dunn and Doctors Reynold Webb Wilcox and Frank H. Daniels.

GREASY COLD CREAMS.

ERNEST R. JONES, PH. C.

I doubt if there is a more popular toilet preparation than a fatty or greasy cold cream. Most every retail druggist has such a preparation under his own label. Many prefer to have these creams prepared for them by some manufacturing house, but there still remains a lot of druggists who will always prepare their own according to some "pet" formula they may possess.

The term "Cold Cream" probably originated from the fact that the evaporation of the moisture from them when applied to the skin gave a cooling effect.

The writer has recently conducted some exhaustive experiments with greasy cold creams and believes that some of his findings will be of great interest to the manufacturing pharmacist.

The pharmaceutical literature is filled with formulas for these creams, some of which differ considerably, and a great many of which give poor products. Let me state at the beginning of this paper that I am not going to give any formulas for making these creams, but will merely give you the results of my experiments and such suggestions as may help you in locating your source of trouble or in improving your formula.

At least four things are necessary to make a good cold cream, namely: 1st, white beeswax; 2nd, an oil; 3rd, a saponifying agent, and 4th, water.

Before taking up these different classes of ingredients, let us consider first

THE CHEMISTRY OF GREASY COLD CREAMS.

These creams are essentially emulsions. What, then, is the emulsifying agent?

We all know that soap has great emulsifying properties. If a soap is formed with the beeswax, and this soap acts as the emulsifying agent, then if the beeswax were omitted and castile soap, or any other soap, used instead, with enough ceresin to harden it, the resulting product should be a cold cream or emulsion. I have made such a cream, and while it is not a salable article, the fact that it was possible to make a cream in such a manner is good proof of the formation of a soap when beeswax is used.

If we mix the proper quantities of stearic acid, alkali, liquid petrolatum, water and an unsaponifiable hardening agent, such as paraffin or ceresin, an emulsion is readily formed. Here the alkali forms a soap with the stearic acid, and this acts as an emulsifying agent.

If beeswax is substituted for the stearic acid, we get the same results. Accordingly, we would conclude that there is present in the beeswax some constituent which will readily form a soap with as weak an alkali as borax.

According to Lewkowitsch[1] beeswax consists chiefly of a mixture of crude cerotic acid and myricin (melissyl myricyl palmitate). It also contains small quantities of free melissic acid and three or four other unimportant ingredients. The amount of this latter acid present is so small that we do not need to consider it.

[1] Lewkowitsch, 5th Edit. Vol. 2, P. 900.

According to Lewkowitsch,[2] free cerotic acid is present to the extent of 12 to 16 per cent, depending upon the source of the wax.

We know that solutions of borax, owing to the hydrolysis that takes place, react quite alkaline; that is to say, its solutions will contain a small amount of sodium hydroxide. When these aqueous alkaline solutions are brought in contact with the melted beeswax, all or a portion of the free cerotic acid is saponified. This soap then acts as an emulsifying agent for the balance of the wax and the other ingredients.

This equation may be represented thus:

$H.C_{26}H_{51}O_2$	+	NaOH	=	$Na\ C_{26}H_{51}O_2$	+	H_2O
Cerotic Acid		Sodium Hydrate (from borax solution)		Sodium Cerotate (soap)		Water

The other ingredient of beeswax, myricyl palmitate, ($C_{30}H_{61}.O.CO.C_{15}H_{31}$) probably is not saponified to any appreciable extent and more likely not at all by the alkaline borax solution, for such esters are very hard to saponify even with stronger alkalies and require considerable time to effect the change. In making cold creams the alkalinity of the borax solution is immediately neutralized by the cerotic acid, and it is therefore improbable that the myricyl palmitate enters at all into the chemistry of cold creams.

I desire to take exceptions to an article on "The Chemistry of Cold Creams," by Groat,[3] who claims that borax reacts with the myricyl palmitate and with the glycerides of other oils and fats to saponify them. The preceding paragraph will show my reasons for differing with him in this respect.

To continue, in the same article Groat gives an equation showing the reaction of the borax and water upon the myricyl palmitate in which he claims palmitic borate is formed. As he does not mention anything at all about the soap that is formed (sodium cerotate) one would conclude that this was his idea of the reactions entering into the manufacture of cold creams. He could not have tried to prove his statements by experiments, for he goes on to say, "We shall now take up the reaction of borax with spermaceti. The chief constituent of spermaceti is cetincetyl palmitate, which is attacked by the borax forming palmitic borate, as in the case of white wax, etc." Here again his idea is the formation of an ester (palmitic borate) by the borax. Let me say right here, that you cannot make a cold cream from spermaceti unless you introduce soap by some other means, for spermaceti does not contain more than traces of free acid and therefore could not form a soap of itself. Palmitic borate does not exist to any extent, if at all in cold cream, and Groat's statements are in my opinion, erroneous. To sum it up, I would say that he has overlooked the presence of free acids in the wax which form soaps with the alkaline borax solutions and instead has given the impression that organic esters were formed. Supposing one should use sodium carbonate or sodium citrate instead of borax. These both form cold creams with wax. Then according to his theories the resulting cream would consist of palmitic carbonate or palmitic citrate. Perhaps he did not know that a cream could be made from these above named substances. I have prepared such creams.

[2] Lewkowitsch, 5th Edit. Vol. 2, P. 905.

[3] Journal of the A. Ph. Assoc., Feb., 1915, P. 169.

Both the carbonate and the citrate give aqueous solutions which are alkaline. According to the Hydrolytic Dissociation Theory we would not expect sodium citrate to give as strongly alkaline solution as the carbonate and could not therefore expect as much soap to be formed or as good a cream as when the borate or carbonate are used. We find such to be the case, but there is enough soap formed to prove that the emulsification of the cold cream is brought about by the soap rather than by the formation of any esters.

Only such fats and waxes as contain free acids can be used to form soaps with the borax solution. Those fats and waxes which are free from acid are only valuable as stiffening agents. You will then see that beeswax or some other such product which has *an acid value* is absolutely necessary in order to make a cold cream.

The acid value indicates the number of milligrams of potassium hydrate required to saturate the free fatty acids in one gram of a fat or wax, and is therefore a measure of the free fatty acids in a fat or wax.

It is evident that if an oil or fat consists exclusively of neutral triglycerides, its acid value will be nil. We would not expect such a fat or wax to yield a soap or to act as an emulsifier for the balance of ingredients.

Lewkowitsch gives the following acid value for the several fats or waxes:

	Acid Value
Carnauba Wax	2
Japan Wax	20
Spermaceti	traces
Beeswax	20
Tallow	4
Paraffin	0
Ceresin	0

According to my theories then, one could not make a soap from paraffin or ceresin and a solution of borax or any other alkaline solution. Consequently a cold cream could not be made from these substances unless wax or some other substance containing free fatty acid is added. From the above table we would not expect spermaceti to act any better for it is, according to the above, a practically neutral substance. Tallow and Carnauba wax will however make an emulsion, but as the quantity of soap formed is very small the cream is not smooth, or in other words, the emulsion is not very good. Japan wax and beeswax we would expect to yield good creams. Experiments made in the laboratory prove this to be so, although I do not recommend Japan wax to you for use in your creams, because it has a lower melting point and more color and odor than beeswax. These statements are offered as further proof that a soap is formed in making cold cream and to show that only those substances containing free acid will make an emulsion when the borax solution is added.

Let us now pass on to the first class of ingredients necessary to make cold cream, namely:

HARDENING OR STIFFENING AGENTS.

Beeswax as you all probably know is secreted by the common bee, *Apis mellifica*. Honey is removed from the combs by centrifugal force. The wax is then obtained by melting and straining or by expression. The expressed wax is as a rule of a yellowish color and has to be purified, followed, if required, by a

process of bleaching, either by air and light or by chemical agents which will yield nascent oxygen.

The best bleached white wax is of a pure white or only slightly yellowish color. The whiter the wax you use in your cream, the whiter the cream will be.

It can be definitely stated that white beeswax is absolutely necessary to every first class white cold cream. It supplies the soap necessary to form the emulsion and gives the smoothest cream of any of the waxes. It should be present in sufficient quantity to give the cream the desired stiffness. However, white wax is quite an expensive substance and a part of it can be replaced by other substances such as spermaceti, paraffin or white ceresin. In making such substitutes one must bear in mind that a certain amount of white wax is necessary to make the emulsion and when too much of the white wax is replaced the creams are not smooth and in some cases there is a tendency towards separation of the emulsion. I would advise you not to try to take out too much of the white wax.

Spermaceti, then, is only valuable as a stiffening agent, because it does not form any soap. It is also quite expensive and has a low melting point (45°-50° C.) More of it is therefore required to accomplish the purpose than is required of either paraffin or ceresin, consequently it is an expensive and unnecessary ingredient. Six samples of cream were made containing varying amounts of spermaceti. The ones containing the least of it were easily selected as being the smoothest, but none of them were as smooth as when the spermaceti was omitted entirely. I would therefore advise that spermaceti be omitted from your formula and that paraffin or white ceresin be used instead.

Paraffin is useful as a stiffening agent. Too much of it cannot be used as it will interfere with the smoothness of the cream.

White ceresin is an excellent stiffening agent when used in conjunction with white wax. Ceresin (osokerite) is a natural earth-wax or hydrocarbon. When purified and bleached it is a snow-white solid resembling paraffin in its properties. It has considerably higher melting point (about 62° C.) than paraffin, consequently less of it is required to produce the same amount of stiffening. It is a little more expensive than paraffin but much less so than spermaceti. Like paraffin, it cannot be used in too great a quantity.

Stearic acid is sometimes used as a stiffening agent, in small amounts. It permits of the incorporation of more water and thus gives a whiter and less greasy cream. It has the disadvantage of making the cream granular in time, even if very small amounts are used. If the smoothness of your cream is a desirable asset, don't use stearic acid.

When creams are to be sold in warm climates more stiffering agent is required.

THE OILS.

Two classes of oils are sometimes used: the vegetable and mineral.

The vegetable oils are said to be absorbed better by the skin than the petroleum oils, and therefore are preferred in medicinal creams. Expressed oil of almonds, peach kernel, castor, olive, cocoanut, cottonseed and sesame oils are frequently used. The objection to them is that when emulsified, they quickly become rancid. Also they impart an odor which is objectionable and do not yield the whitest of creams.

Lanoline is sometimes used, but its odor and color are objectionable. If a white cream is desired, it cannot be used at all. It has the advantage of being easily absorbed by the skin.

This brings us to the mineral or petroleum oils. These oils can be secured in a variety of grades differing in color, odor and specific gravity, according to the price you wish to pay. It is not necessary to buy the Russian mineral oils for creams. American oils are cheaper and good enough grades are obtainable. To make the best cream, the oil should be colorless and with as little odor as possible. The specific gravity may range from .860 to .880. One gives as good a cream as the other, but the one of the higher specific gravity requires less stiffening agent.

A snow-white mineral jelly or petrolatum may be used in creams for warm climates. If used in other climates less stiffening agent should be used. One does not need to pay the price asked for these jellies for they are not natural jellies but are made by solidifying the mineral oil with white ceresin. All you would have to do to obtain this same effect would be to increase the amount of white ceresin in your formula.

The claim has been made that mineral oils induce the growth of hair. The writer believes that this is without foundation and the public have a wrong idea of the matter, which is traceable to unscrupulous advertisements. If there is any growth of hair, it more likely comes from stimulation of the hair cells through massage.

Cold creams made with mineral oil are permanent and do not turn rancid.

THE SAPONIFYING AGENT.

Borax is the best for this purpose. This salt is a combination of a strong base and a weak acid. When dissolved in water, it undergoes hydrolysis, yielding solutions which are distinctly alkaline to litmus. This alkalinity is neutralized by the cerotic acid of the wax forming the soap which in turn acts as an emulsifying agent for the balance of the ingredients.

Creams can be made with any other substances whose solutions react alkaline. Those made with potassium salts are softer than those made with sodium salts.

Borax gives the best and smoothest cream and is to be preferred over all others.

The fourth essential ingredient is

WATER.

Distilled water is always to be preferred, although tap water can be used if it does not contain much calcium or iron. The proper amount to use is an important matter. No matter what the ingredients you select or how good the quality, unless you use them in the proper proportions, that is, have your formula properly balanced, your cream will not be the best possible to obtain.

I have analyzed several cold creams on the market and found them to contain from 22 to 40% of water. The one containing 40% was the whitest but the least smooth of any and contained some stearate; otherwise this high percentage would not have been possible.

It might be said here, that the water is what makes the cold cream white. The more water, the whiter the cream of course, but too much water makes the cream granular and may cause a separation.

My experiments have shown 25% of water to be the proper amount to use from a manufacturer's view point. I have observed such samples during two years and find them to keep perfectly without separation or granulation.

THE PERFUME.

The perfume is added just before the cream is drawn off into the containers, otherwise a portion of it is volatilized by the heat. The perfume should not contain much alcohol as the alcohol has a tendency to break up the emulsion, especially when hot.

Rose, Lilac and Violet are the most popular odors, the rose predominating. Rose and Violet are quite expensive. Lilac is one of the cheapest.

Let me caution you about lilac perfumes for creams. Most of them excepting perhaps a few expensive ones, contain quite a bit of terpineol. Some of you may be using terpineol itself as a perfume. This substance is very irritating to the skin and should not be used in cold creams. Synthetic perfumes are more often irritating than natural oils. If you have complaints that your cream irritates the skin, the first place to look for the trouble is in your perfume.

One other thing about perfumes. They often cause discoloration of the cream, sometimes even making the cream decidedly brown.

The discoloration by the perfume must be distinguished from the loss of whiteness that comes from the cream drying out. To test this, make up two samples of cream from the same formula. Perfume only one of them. Preserve them under the same conditions in the same kind of containers. After standing awhile they can be compared. If the perfume sample is noticeably more discolored than the other, the trouble can be attributed to the perfume.

THE CONTAINER.

Collapsible tubes are by far the ideal, as the cream does not dry out and they are more sanitary.

Collapsible tubes are not as attractive to the trade as jars and are not as convenient for the druggists to fill.

Jars with screw tops are therefore the most popular. You cannot be too careful in selecting your jars. I refer particularly to choosing a jar which has a tight-fitting cover. The covers should require at least a full turn to tighten them and extra precautions such as a paraffined card-board washer should be used. In fact, you should aim at having your jar as nearly hermetically sealed as possible. The reason for this is very simple, yet it is the cause of many a druggist's or manufacturer's difficulties. Cold cream contains water, which cannot help but dry out if improperly protected. As the cream loses water, it loses its whiteness and takes on a lardy appearance. It shrinks in the jar and pulls away from the sides. The result is soon only a partly filled jar.

The cream should be poured into the jars while still liquid and at as low a temperature as possible to prevent too large a hollow being formed in the center. A better surface can be obtained by warming the jars before filling them with cream. This permits of a more even cooling of the cream, whereas when poured into a cold jar the cream cools around the sides and bottom first. As it cools it contracts and forms the hollow in the center and may cause a pulling away of the cream from the sides of the jar.

PINK CREAMS.

Colored creams are novelties. A pink cream with a carnation perfume is quite popular just now.

These are made by dissolving a small amount of an oil-soluble color in the melted fats before adding the borax solution. The latter is not to be colored.

To make a pink cream, use the dye known as Oil Red S.

THEATRICAL COLD CREAMS.

These are cheaper creams and are usually sold in large packages. They may be softer than an ordinary cream. A cheap grade of mineral oil can be used. They are not intended for toilet purposes but for "make-up" use and therefore do not need to be of as good a quality.

TROUBLES YOU MAY ENCOUNTER.

Cream is not smooth. This may be due to a poor formula or to improper care in mixing.

Lack of whiteness. The wax may not have been very white or the cream may have lost some of its water.

Separation of water indicates either carelessness in mixing or more likely a faulty formula. Perhaps your formula contains too high a percentage of water.

Cream appears lardy after standing some time. Indicates loss of water. Covers do not fit tight enough.

Shrinking in the jars indicates loss of water.

Pulling away from sides of jars. If this takes place within a few days it may be due to improperly balanced formula or to pouring the cream too hot or to using too cold jars. If it does not take place for several weeks, it is probably due to loss of water.

Discoloration. This is almost always due to the perfume. The use of iron utensils may also cause discoloration.

Cream separates. May be due to the jars standing in the sun or in too warm a place.

CONCLUSIONS.

1. Greasy cold creams are essentially emulsions, brought about by the formation of a soap by the alkaline borax solution and the free cerotic acid of the wax, the soap acting as an emulsifying agent.

2. White beeswax, paraffin or ceresin, colorless liquid petrolatum (mineral oil), borax and water in proper proportions form the best creams.

3. Creams made from the above ingredients are more permanent than when vegetable oils are used and do not turn rancid.

4. Much attention should be paid to obtaining tight-fitting covers for the jars to guard against loss of water.

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REMARKS ON DIGITALIS.*

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It is generally stated in text-books and also in the United States and other pharmacopœias that the digitalis leaves of the second year's growth are preferable to those of other years, and that the cultivated ones are inferior to the wild ones. Recent observations do not seem to support this statement. F. H. Carr, in the *American Journal of Pharmacy*, states that the first and second year's growths have proved identical in their activity, and the cultivated leaves are at least as active as those wild grown. Hatcher, who in his "Text-book of Materia Medica," by Hatcher and Sollmann, indorses the preference of the second years' growth, has since, in a recent article (*Drug. Cir.*, 1914), claimed equal value for first and second years' leaves, as well as for cultivated leaves in comparison with wild ones. Lloyd's observations also confirm this view, and he attributes the erroneous statement about the second year to the fact that formerly also the root was used, which in the first year is insignificant and sappy, while the second year's root is larger and heavier and more pronounced in quality. There may be another reason, however, for adhering so long to the second year's leaves as better. The statement in the text-books is followed by the other one, "gathered at the commencement of flowering." Now, digitalis does not flower till the second year, and leaves could not be gathered in the first year at the commencement of flowering. As the flowers were also used formerly, and are used today in Japan, it can be understood how the statement of the second year's growth originated, flowers and leaves being gathered at the same time. According to the best investigators, this statement should therefore be changed to "leaves of the first or second year's growth should be used."

Professor Hivohashi, of the University of Tokio, Japan, who made extensive investigations in digitalis, states (*Apoth. Zg.*, 1913, vol. 28, p. 9) that digitalis *flowers* probably contain more of the active constituents than do the leaves, and the buds are more active than are the expanded flowers.

As to the preservation of the gathered leaves, all kinds of more or less complicated directions are given in the various pharmacopœias. According to recent literature, however, foxglove leaves do not differ materially from most other vegetable drugs; that is, they will deteriorate if kept carelessly, and keep almost indefinitely if properly stored in air-tight containers in dark places. The changes that do undoubtedly happen take place in the time between gathering and marketing, according to the manner in which the drying is done.

There are four pharmaceutical preparations of digitalis official in our pharmacopœia, viz.: The extract, the fluidextract, the tincture, and the infusion, of which the first one is but rarely and the second one not often used. According to all authorities, the tincture and infusion are the two most reliable preparations,

* Abstract of paper read before the Pharmaceutical Section of the Cleveland Academy of Medicine, January 29, 1915, through American Journal of Pharmacy.

but there is a vast difference of opinion as to the relative value of the two. Herzfeld states that:

"I believe that in this country the tincture is the least reliable of all preparations of digitalis, particularly since, for the sake of convenience, it is frequently prepared by diluting the fluidextract, which in itself may be inferior."

Other authorities also dwell on the improper preparation of tinctures from fluidextracts. It is well worth while to stop a minute to investigate this charge. I myself have in former years, when physicians made this remark, asked them how many pharmacists, to their positive knowledge, made their tinctures from fluidextracts. Generally the answer was: "Well, of course, I do not know, but conclude, from the fact that sometimes tinctures do not produce the desired effect, that they are made improperly." And when I replied: "Doctor, are you sure that in such cases you always ordered the right medicine?" the answer would be: "Of course I did; I diagnosed the case myself." In other words, whenever the patient does not respond to the treatment the fault lies with the pharmacist, but not with the physician. The unbiased observer will say, if men are apt to make mistakes there will be as many mistakes made by physicians in diagnosing as by pharmacists in dispensing. I personally do not believe that the practice of making tincture from fluidextract is general; it may prevail among lazy and indifferent druggists, who hardly have any prescription trade for this very reason.

Coming back to our subject, there is besides Doctor Herzfeld no other authority to reject the tincture. As a rule, the tincture is preferred to the infusion, so far as reliability is concerned, and whenever the full cardiac effect of digitalis is required. As a diuretic, in cases of faulty circulation of blood through the kidneys, the infusion is preferred by probably 95 percent of all practitioners. An exception is Doctor R. A. Hatcher, who in a recent paper states that:

"As a matter of fact, a properly-made infusion, as well as the tincture, contains all of the therapeutic active principles of digitalis."

He tries to prove this statement by saying that the marc left after making the tincture is inert, and if an infusion be made with this marc and tested on a frog, the truth of this statement becomes apparent. It is to be regretted that he did not also examine the marc left after making the infusion. Later on, in the same article, he says:

"An infusion from a fluidextract might be unsightly, but it would probably be more active than the official infusion which one would obtain from the nearest pharmacy. This practice is distinctly not advocated, but pharmacists should understand the fact."

We ask: Why not advocate it if it makes a better infusion? And if the tincture and infusion are of equal value, why not make the infusion from the tincture, or why not delete one or the other?

In direct contradiction to Hatcher's results we will cite Herzfeld:

"According to the methods of Keller-Fromme, no digitoxin or digitalin could be detected in an infusion prepared according to the U. S. P., while in an infusion, made after my method, as high as 0.02086 percent digitoxin could be found."

Doctor Herzfeld's method is as follows: The leaves are finely broken up and

freed from the stems and ribs. They are then covered with the entire quantity of boiling water and allowed to digest upon the water-bath at 50° C. for one hour. When cooled down to about 32° C. an amount of alcohol corresponding to 10 percent of the finished infusion is added and the whole permitted to stand for twelve hours. The resulting product is then filtered, the leaves expressed, and the necessary amount of water added to restore the volume. Later on he says that this "infusion" (it is rather a weak tincture) should always be prepared fresh. This would compel the patient to wait about fourteen hours for his medicine, a rather long wait for cardiac patients.

In an editorial of the *American Druggist*, 1913, vol. 16, p. 12, the statement is made that:

"According to Henry Beates, not one physician in ten can tell the difference in the effect produced by an infusion of digitalis made from a fluidextract and that produced by one made from the assayed leaf."

This may be interpreted that physicians are not able to tell the effect of their medicine, or that Doctor Hatcher's statement of infusions made from fluidextract is correct.

As to the reliability of the fluidextract itself, we quote J. D. Riedel:

"Fluidextract of digitalis U. S. P. VIII was found to vary in specific gravity from 0.945 to 0.991, and in extract content from 10.30 to 17.41 percent."

And Puckner (*Jour. Amer. Med. Assn.*, 1913) claims:

"Examination of twenty samples of fluidextract of digitalis confirmed the generally-held belief that commercial digitalis preparations vary most widely. The most active were found to be nearly four times as active as the weakest."

Against this statement protests were afterwards printed in a number of pharmaceutical publications.

In the coming pharmacopœia the formula for the infusion of digitalis will remain the same while the alcohol in the tincture will be increased to 60 percent and the fluidextract to 70 percent. It is claimed that this large amount of alcohol is necessary to preserve the preparation.

I regret that the formula for the infusion will remain unchanged. It is now made with the boiling water and 10 percent of alcohol is added after straining. For what purpose is the alcohol added? The properly prepared infusion without alcohol will keep long enough to be taken, and for a longer preservation the amount of alcohol is inadequate. The alcohol should be omitted and the remark: "To be freshly prepared, when wanted," added to the formula. As it stands now, the presence of alcohol misleads many thoughtless pharmacists to think that the infusion may be kept in stock.

Prolonged medication with tincture of digitalis often produces nausea and other untoward effects. It is stated that a certain fat or fixed oil present in the leaves is the cause. As this substance is soluble in petroleum benzin, the leaves can be freed from it by subjecting them to the action of benzin before making the tincture. The general verdict of the medical profession is in favor of this fat-free tincture, although Hatcher and others deny its preference.

According to Hatcher's experiment, isolated fat from digitalis proved harmless. This probably is true, but would be no proof that even a small amount of this fat in the presence of various alkaloids may not influence their action.

As to the source of the best leaves of foxglove not much literature is available. It is stated that the plant grows in England, Middle Europe, and also in America, and here and there the timid statement is made that soil containing iron is best adapted for its growth. According to Gehe (*Handelsberichte,* 1913, p. 84):

"Digitalis is found generally on soil containing iron and manganese, and does not occur in Switzerland on this account. It is assumed that manganese is essential for the life of digitalis."

In contradiction of this, Hatcher says:

"Another curious misconception regarding digitalis which is hard to explain is that the leaf grown in certain regions is more active than that grown in other localities."

This is probably the most remarkable statement in Hatcher's excellent paper. Whosoever has paid attention to the development of agricultural chemistry, the introduction and first results of which have made Liebig immortal, would rather say: "It would be hard to explain if the leaf grown in certain regions were not more or less active than that grown in other localities." I do not think that a plant of powerful and characteristic properties is known that does not change its nature nor produce its constituents in a larger or smaller quantity when transplanted to a new soil. Every farmer in France and Germany knows that the same potato planted in a marshy soil will produce a different tuber than when planted in a sandy soil. Grape vines brought from the Rhine or Garonne to California will flower and bring fruit, but the grape differs in flavor and amount of alcohol produced. The same vine even differs in different parts of California. Many European aromatic flowers, like chamomile, mullein, and others, grow abundantly in America, but lack the ingredients that make them valuable; and they even differ in aromatic properties in different parts of the home country. Why should digitalis be an exception to this general rule? Doctor Thoms, of the Pharmaceutical Institute of Berlin, one of the best and most careful pharmacologists living, states in the last volume of the *Arbeiten aus dem Pharmazeutischen Institut,* 1914, p. 202, speaking of the difficulties of cultivating certain medicinal plants:

"How important, for instance, it would be to have digitalis, which in different parts of Germany is subject to such extraordinary variations in respect to its active principles, under proper scientific cultivation and discover the conditions which for the growth and production of the active principles of digitalis are most favorable."

The chemistry of digitalis is still more confused than its pharmacy, and so far every new assayer has discovered—or claims to have discovered—new principles of various nature. The number of so-called active constituents of the plant is growing daily. Merck & Co., in their annual report of 1911, mention 92 different articles, with their discoverers and properties, and the number has been increased considerably since then. Many of these are identical, and a good many are mentioned only in the papers published by their authors, but were never isolated or brought in the market. Among these many names four stand out prominently, namely, digitalin, digitonin, digitoxin, and digitalein.

The oldest one of these, digitalin-Nativelle, was isolated by the French chemist Nativelle, who claimed it to be a pure substance, while Schmiedeberg, who made

an extensive examination of the plant, pronounces Nativelle's digitalin a mixture of several substances, and gave the name digitalin to another chemically uniform, amorphous body for which he presented a formula. Another digitalin was isolated by Kiliani, another by Homolle-Quevenne, another by Lancelot, another by Lebourdais, and so on. In Merck's list the name of digitalin appears thirty-seven times, each time denoting a different article. No wonder that a confusion prevails and that prescribers and dispensers are at a loss what is meant by digitalin. It is not the object of this paper to enter into the merits of these numerous glucosides for each of which the discoverer or manufacturer claims a certain superiority over others. But in view of these different results obtained by men of great learning, long experience, and renowned ability, we are led to the question if there is not a reason for this disagreement and if perhaps some fundamental facts or principles have been overlooked.

Now, in trying to bring the various results into some classification, we notice that nearly all agree on the fact that some of the products are soluble in water, some insoluble in water but soluble in alcohol. Kiliani states that digitoxin is insoluble in water, Hatcher makes the same statement, while Cloetta separated a soluble digitoxin, to which the name of digalen was given. It is further stated that, while digitoxin is insoluble in water, it becomes soluble in water, best in hot water, in the presence of a certain saponin that is also present and which, according to some authorities, is identical with digitalein, according to others with digitonin. The presence of a saponin is also claimed by a number of other investigators, but by no means by all. It is on this basis that Hatcher makes the claim that the infusion contains all the active ingredients of digitalis held in solution by saponin. He therefore supposes that no change takes place when the infusion cools, although every druggist knows that a slight precipitate forms, and he also must suppose that this saponin and the insoluble digitoxin are present always in the right proportion,—that is, enough saponin to dissolve the digitoxin. As a matter of fact, however, the presence of saponin is still in doubt, and even those who claim its presence do not agree on the quantity, some speaking of a trace only. But nearly all investigators agree on the instability of the various digitalis preparations and the ease with which the one is changed into the other. Some doubt the presence of any pre-existing digitoxin in the plant, believing that it forms, after the leaves are gathered, through the influence of this saponin. We are reminded of bitter almonds, where the amygdalin, through the action of a ferment, is changed into benzaldehyde, hydrocyanic acid and glucose. Might there not be a similar cause in digitalis that would account for the evasiveness of the various chemicals? It cannot be doubted that a soil containing iron and manganese is most favorable to the development of the plant, and, if the claim that manganese is necessary for the production of digitoxin is correct, what hinders us to suspect a certain relationship between manganese and this complex body? To the adherer of the infallibility of the theory of elements such a thought may appear like the outgrowth of a disordered imagination. But other apparently impossible theories have been proved to be founded on facts, and a chemical genius may come some day and upset many of our pet theories. The inadequacy of the chemistry of digitalis should certainly lead the investigators to consider the plant as a harmonious total, and not take out its chemistry as a

part that can be studied and understood without reference to its whole life and development and productions.

It would be wrong to write a review of digitalis without mentioning the physiological tests to which this plant has been subjected in the last two decades. Here the same confusion reigns as in its chemistry. Naturally so. How can we successfully test a chemical before we have absolute knowledge of its properties? Frogs, mice, rabbits, dogs, cats, have been used to establish what is called a standard. But no two investigators agree. These physiological tests are beyond the scope of the pharmacist and physician, as they require especially-arranged biological laboratories that cannot be established without considerable expense. In the same way the physiological chemist requires special training and long experience. Consequently these laboratories are, as a rule, constructed by large manufacturing houses who employ the best talent that they can find. It is natural that these men work in the interest of the firm that employs them and that their researches always confirm the superiority of the preparation that their employers prepare. This is no adverse criticism of their activity. The commercial houses that go to the expense of establishing and maintaining such laboratories try, without doubt, to produce the best articles in every line, and as each and every digitalis preparation has some advantages and characteristics of its own, it is but natural that these advantages are exploited in preference to others. But science gains but little by these efforts, and the skepticism that many entertain in reference to biological tests is justified. This became evident some years ago in New York, when the representatives of a large German manufacturing house undertook a crusade against the sins of certain druggists, as stated, in reality, however, to push and advertise a certain proprietary article. Numerous prescriptions were written by their physicians and then analyzed by chemists of repute, and incidentally a result was obtained that was not looked for. Among the prescriptions were a number for tincture of digitalis. The dispensed articles were sent to a biologist of a good name, who conducted the physiological laboratory of a manufacturing house. He tested them *secundum artem*, without prejudice, and his report was published. It now happened that some of the samples had come from his own house, and had been tested by him, and a certificate as to the strength had been attached to the containers. In his report he declared some of these same tinctures worthless, others too strong. Guaranteed assayed tinctures from other firms shared the same fate. No greater discredit could have been thrown on biological assaying by its worst enemy than by these careful, conscientious examinations. When they were introduced into the pharmacopœia it was stated that they were needed on account of the inadequacy of the chemical test; but, far from solving the problem, they have only added to the confusion and uncertainty.

Before closing I wish to refer again to Thoms' *Arbeiten aus dem Pharmazeutischen Institut.* On page 204 L. Rosenthaler is quoted as follows:

"I am of the opinion that plants produce some of their constituents as a protective weapon against vegetable or animal attacks; but as their enemies do not always have the same geographical distribution as the plants themselves, these protective principles are not needed where the respective enemies are lacking, and consequently are not produced. This supposition explains the fact that the

amount of digitalin of cultivated digitalis is less than that of the wild-grown plants."

This is not a new theory. It has been shown that the cinchona tree produces quinine as a protective against the attacks of certain insects and bacteria, and whenever the tree is transplanted to countries where it is not attacked by these enemies the production of quinine gradually decreases. I also refer to Doctor R. C. Eccles's paper on "Pharmaceutical Bacteriology" in the *Proceedings of the American Pharmaceutical Association*, 1894.

Many other instances of self-protection of plants against surrounding enemies, be they of vegetable or animal nature, or conditions of the atmosphere, could be mentioned. Here, then, is an unexplored field. We generally do not grant self-consciousness and individuality to plant organism, but the few observations that we have made seem to indicate that there is in these low organisms far more foresight and judgment in action than we admit. They may not think, but their work and productions could not be more correct and logical if they had been planned by the most highly developed mind. Nobody ever expects to discover the thoughts of a human being by dissecting his body after death and analyzing the various parts. Can we expect to explore plant life in its conception and its influence on surrounding Nature by dissecting the plant and analyzing what is left after its death?

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Editorial

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THE DYE INDUSTRY.

THOUGH the subjects are entirely different, the press has followed about the same lines of thought in presenting the possibilities of the dye industry as applied anent the cultivation of drug plants. The most important part of the subject namely, the research involved and the concomitant expenses have been obscured by the initial sources of supply.

More will be persuaded to venture into the cultivation of medicinal plants than will even contemplate the manufacture of dyes. The reason is obvious. Without considerable further experimentation, farmers should not be persuaded into drug plant cultivation as a source of profit, without being informed of the many difficulties they will meet with. The Journal has heretofore and again in this issue published papers on the subject. The work of experiment stations should in every possible way be encouraged.

The European war revealed that notwithstanding a high protective tariff on dyes, only a few and a very small proportion of those used, were manufactured in this country. The question, "Why this condition?" was to be expected; the answers in many instances evidenced lack of investigation. A general answer was indicated last month and may be repeated in these words, "the manufacturers and capitalists of this country have not co-operated with industrial and engineering chemists, not having come to a realization of the creative power and earning capacity of industrial research."

In this issue will be found an article on the "Dye Stuff Situation in the United States," by Thomas M. Norton. Among the many other problems confronting this industry is that the system of profitable production depends upon converting wastes or side-products into salable material. The manufacture of these thousands of products demands scientific control and expensive plants and then research work for their adaptation and successful exploitation.

The time seems opportune for keeping the importance of industrial research in the lime-light of publicity, for the discussions in the papers will be productive of good. Such work should be extended in pharmacy schools; even that done in the past, has developed men who have influenced the industries. We might refer to Herman Frasch for one example. He solved the problem of tapping the inexhaustible sulphur fields of Louisiana, that are 1000 feet below the surface and under 500 feet of quicksands. The striking feature of the largest sulphuric acid plant in the world, located at Ducktown, Tenn., is that the acid is made from smelter fumes, the nuisance of other plants. These references are only made to point out the very close relation of our laboratory work with methods that render manufacturing enterprises profitable and promoting others.

Arthur D. Little, of Boston, said recently, we should leave the dye business to the Germans, and consider some of the other things we might do with the vast

expenditure of effort, money and research that would be necessary to rival the Germans in that line.

He makes the statement that we waste 150,000,000 tons of wood a year; a billion feet of natural gas a day; coke ovens flame for miles in Pennsylvania and Colorado, wasting precious ammonia. One-tenth of the research, energy and skill which would be required to rival the German dye industry, if applied to the lumber industry of the South, would result in the creation of a whole series of great interlocking industries, each more profitable than lumbering. The South would be in position to dominate the paper market of the world, he says, transport denatured alcohol by pipe line and tank steamers, make thousands of tons a day of carbohydrate cattle feeds.

We have not made these statements to detract from the dye industry, which presents greater opportunities for pharmaceutical research, but to indicate the numerous avenues for applying our studies.

Finally we repeat that the accomplishment of great things in our related industries requires confidence and co-operation and the practical appreciation by our financiers of the earning power of research. In giving financial aid to research, colleges of pharmacy are entitled to consideration, for these institutions have largely contributed, directly or indirectly, to the development that sustains the chemical and other manufacturing industries, and such assistance will be many times repaid by the production of further opportunities and the discoveries of more economical manufacturing methods.

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NOT MORE LEGISLATION, BUT BETTER LEGISLATION.

WE are pretty well agreed that too many laws are passed and quite a few of these are not adapted to the ends in view.

Systems of business have been radically changed in recent years in order to give more efficient service. The details of conducting a modern business house, especially the methods of publicity are very different to-day than they were ten years ago and the change has affected the manufacture and selling of drugs. Sacrifice of time and money and capable men who were willing to co-operate, has made the reforms possible. Years of experience under former systems and methods not only pointed out the necessity for change but developed the knowledge for practical application.

There is considerable truth in the assertion that our country is coming to a period of statutory morals of justification of any act not prohibited by statute; it is sought to correct and regulate everything by law, whereas there should be a deeper sense of personal, social and public duty. The Hon. Thomas W. Shelton, of Norfolk, Va., said recently: "This country needs fewer laws and more real men; less jural regulation and more moral sensibility; fewer codes and more decalogues." The intelligence of a people is reflected by character, and the stability and quality of government depends on the moral evolution of its citizens.

We advocate preventive medicine and are fully convinced that there is wisdom and economy in the correction of conditions that breed disease. This we have discovered through practical experience. It would seem that experience with unsatisfactory systems of legislation and impractical laws should have instilled suf-

ficient wisdom for legislative reforms. States have become deeply interested and some of them have nullified numerous laws, but so far this has amounted to little more than patch-work, erecting further structure on the same defective system.

We must have laws, but the methods of framing and enforcing them can be materially improved. The topic has been freely discussed in the magazines and there is no reason why we should not participate, as our work occasionally comes within the range of the legislators' aim. Though the laws relating to pharmacy may not be altogether satisfactory, we have fared remarkably well and the object of this writing is not a discussion of laws, but if possible, to assemble a few familiar thoughts anent the causes of defective and superfluous legislation.

Intelligent understanding of widely different subjects is necessary for enacting laws. Vigilance is required so that proposed legislation may be scrutinized, and initiative combined with persistence, is essential for needed legislation. Deficiencies promote divided responsibilities and willingness to take chances, that somewhere and somehow, if proposed legislation is not needed, the bill will not be enacted.

The recognition of legislators depends largely on their success in carrying bills through or killing those proposed by another; most of them come with local measures or promises that have secured them election. These are the predominant thoughts, rather than the study of general public interests. The protection of the latter is "everybody's business" and in practice it is "nobody's business."

Now as to divided responsibility, the lower house depends on correction by the upper and it in turn expects the Governor's veto if the measure is imperfect or undesirable. Within the several bodies there is also a divided responsibility, looking to chairmen or presiding officers for direction. The responsibilities are thrown backward when inquiry demands an explanation, and so no one definitely assumes responsibility.

The same practice obtains relative to measures that should be enacted, the responsibilities are shifted back and forth until about all that is known is, that the provision did not materialize.

Non-enforcement of laws and inefficiency of officials is also traceable to divided responsibility. The law is blamed, the judge or other officers, the grand jury, but the blame is seldom definitely fixed. The conduct of our public affairs is too frequently placed in the hands of plausible politicians. Competency is usually a demand of business, though many a large business has declined because a father's son or personal friend needed a job. In the selection of legislators and officials preferment is often given on account of political claims or sectional recommendation; lawyers secure many of the odd jobs in public service in consideration of their speech-making, prior to election.

Walker D. Hines in an article in the Atlantic Monthly for May on "Our Irresponsible State Governments," says:

"The American people have come to assume an attitude of indifference and hopelessness toward the state governments. Legislatures are expected to prove failures. Governors and other state officials are expected to be inefficient. The work of local officers is rarely taken very seriously, and is expected to be spasmodic and fragmentary. The public rarely has any disposition to locate respon-

sibility for inefficiency in affairs of general interest, because the inefficiency is so general and the search for responsibility is so hopeless. Is it not fair to say that our scheme of divided responsibility has been a school for the encouragement of political inefficiency, and for the promotion of petty local interests at the expense of the general welfare, and has supplied an atmosphere devoid of stimulus to efficient work?"

The legislative system can be improved just as business has become more efficient by fixing not only responsibility but demanding intelligent and studied cooperation. We should realize that laws without men avail little, that they must be honest, but also have vision and courage. Our attitude should encourage capable men to give their time to the important duties of legislation and office instead of erecting obstacles that intensify tendencies in the opposite direction.

What the American people of to-day need is not only preventive medicine, that is, the adoption of rules of conduct that will eliminate the possibility of illness and the unnecessary use of drugs, to the end that the public health may be conserved; but also, preventive law, that is the cancellation or codification of existing laws, and not the enactment of new ones; and the education of the public, or rather the individual units composing the public, which go to make up public opinion, regarding their civic responsibilities. If the moral sense of the people of a city, state or nation, be raised, it will follow that the morale of the city, state or nation will be raised, also.

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AN IMPORTANT RULING ON THE HARRISON LAW.

PHARMACISTS as well as physicians have been more or less concerned regarding the amount of narcotic that may be dispensed and prescribed for a patient. The law itself, leaves the decision with the pharmacist and physician, under the provision that the dispensing and prescribing must evidence good faith and not evade the purposes of the act.

The quantity for treating habitues will differ and in every instance, a larger amount will be prescribed than required in general practice. The Commissioner of Internal Revenue has issued a ruling under date of May 11, as follows:

"Where a physician, dentist, or veterinarian prescribes any of the aforesaid drugs (those included in the provisions of the Harrison law) in a quantity more than is apparently necessary to meet the immediate needs of a patient in the ordinary case, or where it is for the treatment of an addict or habitué to effect a cure, or for a patient suffering from an incurable or chronic disease, such physician, dentist, or veterinary surgeon should indicate on the prescription the purpose for which the unusual quantity of the drug so prescribed is to be used. In cases of treatment of addicts, these prescriptions should show the good faith of the physician in the legitimate practice of his profession by a decreasing dosage or reduction of the quantity prescribed from time to time, while on the other hand in cases of chronic or incurable diseases, such prescriptions might show an ascending dosage or increased quantity. Registered dealers filling such prescriptions should assure themselves that the drugs are prescribed in good faith for the purpose indicated thereon, and if there is reason to suspect that the prescriptions are written for the purpose of evading the intentions of the law, such dealers should refuse to fill same."

This ruling requires that the dispensing and prescribing of unusual amounts of narcotics must be made a matter of record. The habitue may, of course,

object to such information passing from the physician to the pharmacist, but the ruling conforms to the purpose of the law, namely, to stop illegitimate use. Pharmacists will doubtless be pleased to have this ruling and it is for that reason editorial reference is made. How far the pharmacist will be expected to go in establishing good faith on the part of the physician, is a question of some importance in the larger cities. Physicians who treat habitues will write more prescriptions for narcotics than regular practitioners.

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THE STEVENS BILL.

OPPONENTS of the Stevens Bill base their case on alleged restriction of trade that would follow its enactment.

No one will deny that monopolies have generally been established by unrestricted competition, promoted by price-cutting. One of the weapons of monopoly is to cut the price when a small dealer endeavors to compete; after he fails or sells out to the combination, prices are again restored. This seems to be true in oil dealings, the cause of idleness of cinnabar, copper and iron mines, etc. Monopolistic advantages obtain when concerns own stock in transportation companies that make special rates or grant rebates to the favored few; delay transit, thereby destroying the trade, profit or goods of those who dare compete.

Under the Stevens Bill a manufacturer may create a special value for an article in the mind of the public, but if corresponding merit does not exist, certainly another manufacturer of a similar article, but materially better, becomes a competitor. Price maintenance has for its purpose the *prevention* of restraints of trade and the practices which suppress competition and make monopoly possible.

The Stevens Bill would legalize restricted sales of certain merchandise, just as real estate transfers may provide protection against undesirable occupation, use or resale. Every one is familiar with such restrictions and no one considers these unjust or non-enforcible. Injury could otherwise be done to residential sections of a city. Equally as great injury is done to a manufacturer when the market for an article he has established is destroyed by cutting prices on such goods. Nobody is forced to buy articles on which a price has been fixed by the manufacturer.

The Stevens Bill simply presents that manufacturers have a right to protect their property by similar restrictions recognized as lawful in connection with real estate. The recognized opposition to the measure ought to furnish sufficient argument for the retailers that their stand should be enthusiastically favorable to the Stevens Bill. Retailers should also be assured that the bill will never become a law unless they exert themselves and give moral support to those who are endeavoring to promote its enactment. We speak for the measure at this time, because the associations of various states hold their annual sessions during this and succeeding months.

IN AID OF BELGIAN PHARMACISTS.

LAST November the Netherland apothecaries inaugurated a plan, providing assistance for Belgian pharmacists who had suffered loss as a result of the European war. While realizing that their financial ability was not adequate, they believed their initiative would encourage pharmacists of other neutral countries to join them in this worthy undertaking.

The contemplated fund is to be placed in the hands of a Belgian Commission and the money thus collected loaned without interest to their Belgian colleagues. The Netherland committee of pharmacists felt assured that if the Belgian Commission could say to pharmacists in other countries that in Holland 50,000 francs had been subscribed, liberal responses would be forthcoming.

A letter from Amsterdam, addressed to the American Pharmaceutical Association in March, and signed by President J. J. Hofman and Secretary J. F. Suijver of the Netherland Society for the Promotion of Pharmacy, advises that 25,000 francs have been subscribed. With this communication, an authentic list of Belgian pharmacists, who have lost everything, is transmitted, and also views of quite a number of ruined pharmacies.

The encouragement of the American Pharmaceutical Association is solicited, and this reference is made so that the members may consider the subject, preparatory to action by the Association or as individuals. In this connection it may be said, that the Philadelphia College of Pharmacy has responded to the call; we are not advised as to whether other institutions have done so.

The subscription is to be made up of 100-franc shares and the intention is that this shall constitute a loan-fund, though it is indicated that repayment will doubtless be slow. Pharmacists of Belgium who have sustained loss of their pharmacies will be loaned an amount to be decided upon by the Belgian Commission, without interest. Five hundred Holland pharmacists have been asked to donate and out of that number 192 had responded at the time the communication addressed to the American Pharmaceutical Association was written. The Commission is to make periodical reports of contributions and expenditures.

It should be understood that the creation of this loan-fund is only for the benefit of Belgian pharmacists and is to be distributed after peace has been restored. We make no further comment than to ask the members to give this communication, which expresses the sympathy of pharmacists in one country for afflicted colleagues in another, fraternal consideration.

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PAN-AMERICAN FINANCIAL CONFERENCE.

WHILE this editorial must be written, even before the Pan-American Financial Conference convenes, pharmacists, as all other American citizens hope for its success. Invitations were extended by the United States to every other American Republic, and all except Mexico and Haiti will be represented.

In a communication to the press, Mr. John Barrett, Director General of the Pan-American Union, said:

"Pan-America and Pan-Americanism are becoming the slogans of the hour. The people of this country are awakening, as never before, to an appreciation

of the importance of the relations of the United States with its twenty sister American Republics. These countries and their peoples, in turn, are showing today a more kindly feeling than they have ever done before toward the United States and its people. While the work and propaganda of the Pan-American Union, the official international organization in Washington of the twenty-one American Republics devoted to the development of commerce, friendship and peace among them all, together with the attitude and addresses of its governing board, has been in a large degree responsible for this new spirit of Pan-Americanism, the European war has also been a mighty influence in its promotion.

"Considering the effect of great political and international events in history, it might be said that the European war has done more than any other similar influence, since the declaration of the Monroe Doctrine in 1823, to encourage solidarity, common sympathy, common interest and common purpose among the republics of the Western Hemisphere. In other words, the silver lining of the European war cloud is the favorable effect which that terrible conflict has had upon the commercial and political relations of the American nations."

We are interested largely because of the opportunities for our chemical and pharmaceutical industries. Incidentally, we have made reference to this important conference, in order to again bring up the subject of more general use of metric weights and measures. While quantities of the Pharmacopœia are designated in that system, drugs and chemicals that enter into the manufacture of the preparations are still bought and sold by the pound.

The money units of the South American republics are very similar to ours; if we are not misinformed, most of them employ the metric system commercially, hence they would undoubtedly prefer that this system of weights and measures be used in our dealings with them. Means of exchange are helpful factors in the promotion of business relations.

The commercial use of the old system of weights and measures frustrates the efforts of schools to establish the metric system or even such endeavor through official recognition.

The National Grocers' Association, at their annual meeting last month in San Francisco, voted in favor of the adoption of the metric system. Voting to do so, and putting this into practice are two entirely different propositions; one is easy, the other is apparently difficult—the remark is based on our experience.

In view of the fact that an International Pharmacopœia seems improbable, a Pan-American Standard might be attempted. It may be taken for granted that the Pan-American Conference will indirectly promote a more extended use of the Spanish Edition of the United States Pharmacopœia in South America.

<□>

THE GRADUATES.

DURING the last few weeks, parting words of advice have been spoken to graduates of Pharmacy Schools. The graduate's further task now is not only that of pharmacist but citizen, accompanied by stern responsibilities and charged with the accomplishment of duty—the battle of life against many tempting, ignoble and base circumstances. A good pharmacist is greater than he who taketh a trench; though this may be the result of heroic determination, the

task is of short duration. It is a life-long effort to be a good pharmacist, each day beset by mines and submarines and poisonous gases that attack his character. The graduate pharmacists have great advantages over those who have not had these opportunities; their responsibilities are correspondingly greater, neither can they plead unpreparedness for duties they must assume. They are expected to be leaders in their profession at home and in the ranks of pharmaceutical associations. The graduates of pharmacy, of whatever title or degree, are cordially invited to membership in the American Pharmaceutical Association, so that they may be helpful and profit by such co-operation.

E. G. EBERLE.

Panama-Pacific International Exposition

FIELDS AND WOODS IN JUNE.

WILLIAM C. ALPERS.

A stroll through the fields and woods in June is a delight and recreation. Every pharmacist should take a day off and inhale new hope and confidence with the fragrant air of budding and flowering nature. It is true, the first messengers of spring have disappeared. The lovely sanguinaria with its snow-white dress greets us no more and the saucy jack-in-the-pulpit does not preach his silent but impressive sermon any longer. But there is ample cause for enjoyment and admiration. Over yonder through the woods we discover a cluster of white blossoms, not showy, but nevertheless attractive. If we only look at the leaves of the shrub we might think it is a young maple. But the blossoms tell us that it is the viburnum that welcomes us. It is a flowering shrub masquerading in the guise of a tree. We might call it the joker of the woods. There are other masqueraders of the June woods. At a distance we see a wild rose, at least we think so. And even when we approach we do not doubt its identity. It is big and rich in color. But the stem of the plant has no thorns, and almost bewildered we again examine the flower. And now we discover that it is the showy blossom of the flowering raspberry, having a striking resemblance to the wild rose, although entirely different from the ordinary raspberry flower that nearly everybody knows. In strolling further we rejoice at the splendor of a cluster of iris versicolor with their light blue petals. This beautiful flower loves company and never grows alone; there is always a whole family, a whole tribe together, kissing and gossiping with each other. The ground becomes moist and swampy and we are about to turn, when from behind an old half-decayed trunk of a tree a nodding leaf seems to invite us to come nearer. Our efforts are well rewarded, for there almost hidden in a fissure of the tree grows the lovely orchid, the cypripedium, the showy ladies slipper rather reluctant to show its beauty. Thus we stroll from bog to bog, from bush to bush, and inhale the sweet fragrance of the elderflower that early spring has coaxed to unfold before the time. A foolish June bug buzzes into our ear and almost frightens us. Of course, he could not harm any one, and he is all too gentle to do so if he could. And he has neither beauty nor song to atone for his clumsiness. It seems he is made to blunder and annoy.

In our enjoyment of the beautiful June air we do not notice that the sun is going down; the shadows of the trees grow longer and the enchanting charm of the forest twilight gradually surrounds us. We know that it is time to leave the woods, as we might loose our way if total darkness befalls us here; and yet we linger, drawn back by the hands of fairies and sylvan spirits. Here and there a sudden light flares up. Fireflies have lit their candles and show us our way. Before us a large meadow expands. We stop in order to inhale once more the refreshing air full of ozone and terpenes. But we cannot proceed, a new charm retards our steps. This time it is not the eye that is enraptured, it is the ear. We now know that the fireflies were only the first announcers of the concert

that is to come. They arranged the notes and instruments. Here and there a chirp, a rasp is heard, like the tuning of the string before the real performance begins. Full of expectation we lean against a tree or stretch out under a sweet-smelling elder bush. Everything is ready and full of inspiration drawn from the beautiful June night, the thousands of nocturnal choristers of the grass sing and play their notes. There is a buzzing and chirping and trilling and rasping without end; each in itself perhaps without account and not much to listen to, but the blending is restful and charming and almost overwhelming.

And now comes the soloist of the bug orchestra, a tree toad, that sings its note with a serious deep voice but full of enthusiasm. The chirping of the bugs is more than a summer's monotonous lullaby, it becomes the musical background of a more skilled performer and assumes a new higher quality. Suddenly the soloist ceases and it appears as if everybody was quiet; the solemnity and grandeur of a June night seems for a moment to overpower all the other charms. Then he begins again—perhaps he has only stopped for refreshments and eaten some of his musicians—and anew the little buzzers and chirpers intonate their songs.

As we listen in rapture we try to analyze the performance and identify the individual performer, the cricket, the grasshopper, the locust, the golden beetle and others. But we fail in our task and wearily close our eyes, not to sleep, but to relax into a sweet vagrant reverie. Dream pictures appear before us as from the embers of an open fireplace in midwinter. Sweet recollections of our childhood and scenes of days long past and almost forgotten rise in our minds, and the untiring song of nature recalls the harmonies of a Beethoven sonata or Liszt's rhapsody to our ears, when in the circle of a contented family we mused in the twilight while a beloved one, long departed, gently touched the keys with magic finger.

The commercial druggist who knows no music but the clang of coin, may laugh and sneer at our weird imagination that sees beauty in useless weeds and hears melody in the noise of bugs. Let him sneer, poor man. He knows not what he misses. The revelations of nature are for him a sealed book, and his heart never thrills in ecstasy of the wonderful pleasures that she willingly gives to those who understand her, pure and innocent, sweeter than music, richer than gold.

DYESTUFF SITUATION IN THE UNITED STATES.*

THOMAS M. NORTON.

If the plans of the officials of the Commerce Department shall materialize, the urgent suggestions made by the experts of that and other departments of the government, who are constantly examining into the situation with respect to dyestuffs, will be carried out by President Wilson's administration in urgent recommendations that Congress shall safeguard any developments of the dyestuffs industry in this country by effective legislation in the form of an anti-dumping clause, or such amendments to existing laws as will prevent the German dyestuffs manufacturers flooding this country with their products and putting the domestic industry out of business when the European war shall end. It is known that

*Oil, Paint and Drug Reporter, May 24, 1915.

strong recommendations have been made that President Wilson shall take a positive stand on the subject. Such suggestions have been made by Commercial Agent Thomas M. Norton who virtually has charge of the investigation and developments of the situation, so far as information regarding dyestuffs in this country and in foreign countries is concerned.

A summarization has been made by Dr. Norton in connection with his report showing in brief form the points he has brought out. He has itemized these points as constituting factors of controlling importance in the general situation as to dyestuffs production. He says:

In reviewing the general situation the following factors are of controlling importance:

The stocks of dyes of German origin in American warehouses and mills is rapidly approaching exhaustion. It will probably disappear before the end of July.

Permission for the free passage of two cargoes of German dyes for American consumption—sufficient for two to three months—was granted by the British government on April 14, but thus far permit for export has not been granted by the German government.

An ample stock of coal-tar dyes, ready for export to the United States, is held by the German manufacturing firms. It awaits the opportunity and assurance of safe transport.

The importation of Swiss dyes—forming normally about 9 percent of the total imports of artificial colors, and exceeding $9,000,000 in annual value—continues in diminished volume. The value during the March quarter, 1915, was $191,000.

The existing American coal-tar chemical industry is making every effort to increase its output, and is rapidly overcoming the handicap resultant from its dependence in the past on German intermediates. This output will steadily increase with each passing week from now on.

An ample supply of American coal-tar crudes is assured for the prospective needs of dye-stuff manufacturers.

The American manufacture of aniline and other coal-tar intermediates, from American crudes, has been started upon a generous scale by all existing dye-stuff works, and by five new plants specially devoted to this field. Several other works are in process of erection or in contemplation.

The foundations for a genuine American coal-tar chemical industry are apparently being laid.

This industry can supply only a small share of the American demand for the current year, but is susceptible of steady and relatively rapid expansion.

No provision is yet made for the American manufacture of alizarin or of synthetic indigo.

American consumers of artificial dyestuffs are promptly taking steps to use natural dyestuffs and mineral colors during the time that the output of American dyes is necessarily limited.

American manufacturers of natural dyestuffs in the form of pastes, extracts, etc., are making adequate preparations to supply the expected demand. They are providing ample instruction in the modern approved methods of using vegetable dyes.

There is a general recognition of the fact that the prospective scarcity of artificial dyestuffs is due to circumstances entirely beyond the control of the American government and of the American color industry, and that both are making every effort to lessen the inevitable hardships attendant upon the unprecendented conditions.

Consumers of dyestuffs are resolutely adjusting manufacturing processes, so that they may be prepared in time to revert to the use of natural dyestuffs or mineral colors with a minimum of friction should the necessity arise. Consumers of dyed materials are good-humoredly accommodating themselves to a prospective limitation in the gamut of colors. All sense of hardship disappears before the huge pall of misery and suffering hanging over the countries now engaged in the struggle that has caused this temporary famine in a class of materials almost indispensable to many American industries.

IS A SELF-CONTAINED AMERICAN COAL-TAR INDUSTRY PROBABLE?

The spontaneous effort on the part of American capital and enterprise to meet the exigencies of the present emergency reveals the existence of dormant possibilities of far-reaching importance.

Adequate steps have been taken to assure an abundant supply of all the coal-tar crudes needed by a well-rounded American coal-tar industry as fast as the demand develops.

A strong effort is being made to establish upon a firm basis the manufacture of a wide range of American coal-tar intermediates.

The manufacture of a limited number of staple coal-tar dyes is being pushed with remarkable energy, and the number of these dyes promises to increase steadily.

Evidently much has been done during the last few months to lay the foundations of a genuine national industry, capable ultimately of meeting the great mass of American demands for artificial dyestuffs.

Unquestionably much of the capital invested during the last few months has been in the nature of a speculation. At current rates for aniline and for finished dyestuffs there was a fair chance of quickly covering the cost of a new plant, of making a good profit, and of being in a satisfactory shape at the return of normal conditions to embark in competitive manufacture under favoring circumstances.

Numerous interviews with those who have participated in these preliminary steps in the evolution of a national industry have brought to light a marked confidence on their part in the final success of the undertaking, provided the capital invested is exposed to no more danger than that involved in fair and open competition with foreign manufacturers of dyestuffs.

Capital hesitates under existing conditions to embark heavily in an undertaking where there is a strong probability, if not a certainty, that upon the return of normal conditions an incipient, half-developed American industry would be exposed to prolonged and relentless underselling by foreign competitors possessing almost boundless resources, financial and technical.

There is a very strong conviction among those experienced in the industry and among those just entering it that the majority of the coal-tar intermediates required in making dyes, and the great bulk of the coal-tar dyes now imported from

Europe, can be profitably manufactured on American soil under existing tariff rates if there is adequate statutory protection against the so-called "dumping" of foreign wares; or, in other words, protection against unfair competition in restraint of trade by persons or firms outside of American jurisdiction.

Whether public opinion will recognize general legislation in this direction as of urgent necessity remains to be seen. There seems, however, to be no question but that ample capital is available for the needs of an American coal-tar chemical industry, and that a large measure of enterprise and technical skill is ready to enter the new field, provided this one serious obstacle is definitely removed.

There are no plans in view at present for any attempt to establish in our country the manufacture of those coal-tar dyes which for a number of years have been upon the free list, namely, synthetic indigo, synthetic alizarin, and the various anthracene and carbazol colors. They constitute about 20 percent of our imports of foreign dyes. The establishment of works for producing these colors can profitably be postponed for a few years, as the complete installation of adequate plants to produce the remaining 80 percent of artificial dyes involves problems not to be solved entirely in one or two years.

After thus summarizing the points brought out in his report it is well to call attention to the details as they are set forth by Dr. Norton, covering the present supplies, activity of American manufacture and the present output of finished coal-tar dyes. Mention is also made by Dr. Norton of the educational propaganda which he seeks to demonstrate is necessary to a complete understanding of the requirements of the situation. This part of Dr. Norton's report is as follows:

The scarcity of artificial dyestuffs is being felt more and more acutely each day throughout the country. The great textile interests, the manufacturers of paper, ink, varnish, pigments, leather articles, feathers, etc., find it increasingly difficult to obtain needed supplies of colors. Many brands have completely disappeared from the market. Small supplies of Swiss coal-tar dyes, shipped via Bordeaux, are still received. Since March 19 no shipments from Germany have entered American ports.

HOW CONSUMERS ARE FACING THE SITUATION.

Some large consumers of dyestuffs were far-sighted enough to lay in very heavy supplies immediately after the outbreak of the European war. One of the largest textile firms in New England has now on hand a stock adequate for its needs until the beginning of next winter. There are a few other houses similarly supplied, but the number is very limited. Most of the textile and other works dependent upon dyestuffs have not attempted to carry a reserve above what would cover normal consumption for a period of about two months. Such reserves have tended to decrease as a result of the restricted distribution from the stocks of importing agencies. The great mass of consumers of foreign-made dyes will probably have exhausted their supplies by the middle of July, 1915, under existing conditions.

The majority of such consumers appear to have begun promptly to make preparations for the inevitable changes following a cessation in the customary supply of colors. These changes are manifold in their nature. They involve alterations and modifications in styles and color schemes, the utilization of dyeing materials requiring unfamiliar methods of application and a more or less serious

dislocation and readjustment of all phases of manufacture dependent upon the element of color.

Careful attention has been given to the supplies of aniline dyes that the few American manufacturers of such products are able to place upon the market in the immediate future. In most cases the technical staff is earnestly studying the problems connected with a temporary use of natural dyestuffs.

ACTIVITY OF AMERICAN MANUFACTURERS.

In all this period of uncertainty and anxiety, when vast business interests are threatened at a vital point, there is something decidedly cheering in the enterprise and intelligence being brought to bear to solve the difficult problem in a genuinely national way.

With each added week since the shipment of German dyes has been placed under embargo, and each successive indication that a lengthy period must probably elapse before the customary machinery of supply can again be set in motion, there has been a steady growth in the feeling throughout wide circles that the time is ripe for our American coal-tar chemical industry to expand from its present very modest proportions to a position where it can become the dominant factor in meeting the needs of sister industries.

This conviction is finding practical expression in a variety of directions. A review of what is being done shows clearly that not only is every effort being made to meet the urgent demands of a critical situation, but that the foundations are being laid for the more permanent evolution, along natural and healthful lines, of a distinctly American color industry, using American raw material and meeting the bulk of American needs.

The three phases of the complete industry are the production of coal-tar "crudes," of "intermediates" or semi-manufactured compounds, and finished dyes. Along all three lines pronounced progress has been made during the last few months.

MANUFACTURE OF COAL-TAR CRUDES.

The erection of adequate recovery plants in connection with coke works is making rapid progress. In addition to a list of such plants given in Commerce Reports for April 20, 1915, mention may be made of the new Laclede Coke Works at St. Louis, built at an expense of $2,000,000. Active operations begin June 1. The daily consumption of coal is 1,000 tons. Ample provision is made for the collection of by-products. The large Zenith Coke Works at Duluth have recently completed the installation of a benzol-recovery plant. Within a few weeks the daily output of benzol from American coke works will exceed fifty tons. Inquiries made at the Bureau of Foreign and Domestic Commerce regarding constructors of by-product recovery apparatus show that there is a widespread interest in stopping the current wastage of a valuable by-product and in insuring an increased supply of raw material for the use of dyestuff manufacturers.

Under ordinary circumstances this rapid development in the output of benzol, naphthalene and the other important crudes would have meant an oversupply. As it is, the demand for benzol and for toluol in the manufacture of high explosives, chiefly in the forms of picric acid and of trinitrotoluol, has become so

pressing that the current prices for the two hydrocarbons, when not covered by contract, are at least quadruple those prevailing a year ago.

This circumstance hampers to some extent the efforts of those engaged in the manufacture of intermediates. The price of naphthalene, also, has rapidly risen during the last few months. Before the war two-thirds of our current consumption was imported from Great Britain and Germany. It is probable that with the steady expansion of by-product recovery plants in the coke industry and the enlargement of the facilities in the work for separating and purifying the various crudes, prices will now begin to fall, at least for benzol and naphthalene.

PRODUCTION OF INTERMEDIATES.

The manufacture of intermediates is actually the most difficult part of the whole problem connected with the dyestuff industry. The production of finished dyes from the various intermediates is in most cases relatively much simpler than the transformation of crudes into intermediates. Hitherto American makers of artificial dyestuffs have depended almost exclusively upon intermediates of German origin. Since the outbreak of the war in Europe it has become clearly evident that the manufacture of the leading intermediates on a generous scale is necessary to the continued activity of American dyestuff plants and the evolution of an independent, self-contained industry.

ANILINE OIL.

The most important intermediate is aniline. The equipment of a large plant for the manufacture of this product by the Benzol Products Company has been the most important factor in the situation. The output of the works at Frankford and Marcus Hook, in Pennsylvania, is now sufficient to meet the needs of American dyestuff makers. The Edison Company has likewise established a large plant for the production of aniline at Orange, N. J. It is in active operation and will be enlarged.

The E. I. du Pont de Nemours Powder Company of Wilmington, Del., has acquired the large works of the Bayway Distilling Company at Elizabeth, N. J., used for rectifying and preparing pure benzol and toluol, and has arranged for manufacturing aniline from such benzol as may not be required in the production of high explosives.

At Elizabeth, also the Midvale Chemical Works of St. Louis is erecting a large plant destined for the manufacture of aniline and other intermediates, and ultimately of finished dyestuffs. The plans are extensive and include separate buildings for each product.

It is plain that very ample provision is being made for the production of aniline on a large scale. There will be an adequate supply for manufacturers who are engaged in the preparation of more complex intermediates derived from aniline —dimethyl-aniline, etc.—and of the aniline dyes made from them. There will also probably be a large amount of aniline salt available to use in dyeing aniline black.

NATURE OF CONTRACTS FOR INTERMEDIATES.

The output of these aniline works is largely contracted for ahead. A typical contract runs for three years, beginning with July 1, 1915. The buyer fixes in the month of May, preceding each year, the amount of aniline required monthly,

during the twelve months commencing July 1. This amount may be increased or diminished in any month by the buyer to the extent of 5 percent. He may not increase his monthly average for an ensuing year by more than 10 percent except at the option of the seller. Subject to these conditions the buyer purchases from the seller all aniline oil to be used by him during the three years. The price may vary between 10.93 cents and 25 cents per pound during 1915 and between 10.93 and 15 cents after January 1, 1916. It is to be regulated "by the fair, average market price in the United States, as the same may be determined by competitive offerings and sale." The contract "embodies the terms of a co-operative effort, which it is intended will lead to the establishing in the United States of a coal-tar chemical industry. It is entered into by the buyer with the intent of furnishing the seller with a firm outlet, at a fair price, for a large portion of his production during the currency hereof, and with a view of encouraging the seller to embark and continue in the manufacture of aniline oil and other derivatives of crude benzol on a large and permanent scale; and in order that the buyer may derive the benefits consequent upon securing at a fair price an ample, adequate and permanently regular supply of prime aniline oil of domestic manufacture on a preferential basis."

A contract of this nature appears to be regarded as well adapted to meet the exigencies of the situation and has been readily accepted by users of aniline. It relieves dyestuff manufacturers from the responsibility of providing their most important intermediate, and leaves them free to concentrate their efforts upon products of a more complex nature, involving a higher grade of technical skill and operations of a more difficult character. At the same time the American aniline industry has three years' leeway to establish itself so firmly that it may easily resist all foreign competition of a legitimate character.

Aniline was sold in American markets at 10 cents per pound a year ago. Evidently a minimum of about 11 cents is regarded as the lowest price at which it can be produced in this country at a fair profit.

OTHER INTERMEDIATES.

The American manufacturers of coal-tar dyes have taken up seriously the production of those intermediates needed to make the more important colors which they have hitherto furnished to the American trade.

The Schoellkopf, Hartford & Hanna Company, at Buffalo, the oldest and largest of the American establishments, started last autumn extensive preparations in this field. It has now seven complete plants for the preparation of various intermediates. The attempt has not been made to produce at once all of the numerous intermediates that were formerly imported from Germany. A sufficient variety, however, is now in regular process of manufacture to enable the company to produce regularly such colors as formed the bulk of its output before the war.

This policy is evidently dictated by the circumstances, which plainly require in the interests of American consumers that there should be a maximum output in the shortest time possible of a small group of recognized staple colors.

Essentially the same policy has guided the activity of the smaller plants. The W. Beckers' Aniline and Chemical Company, at Brooklyn, is erecting twenty-

three buildings in its new plant. Of these seven are completed and manufacturing operations have already been started. The firm will make all of the fourteen intermediates required in the production of the group of dyes that it carried on successfully before the war.

The same is also true of Heller & Merz and of the Central Dyestuff Company, of Newark, N. J. Each of these two firms is erecting commodious new buildings and starting the manufacture of the intermediates formerly imported from abroad.

In addition two new companies have been organized for the manufacture of coal-tar products, the American Synthetic Color Company, at Stamford, Conn., and the Standard Aniline Company, at Wappingers Falls, N. Y. Both have well-equipped plants and have already begun the manufacture of intermediates, delaying for the time being any attempt to turn out finished dyes.

The more important intermediates hitherto imported from Germany and now being manufactured regularly in the United States are: Aniline oil and salts, A and B naphthols, para nitraniline, dinitrobenzol, dinitrotoluol, toluidine, nitrotoluidines, toluylenediamine, A and B naphthylamines, phenylenediamine, phthalic acid, acetyl-salicylic acid, salicylic acid.

The names of the intermediates are arranged in the order of the extent to which they have been imported, aniline leading the list.

It is also of interest to know that one manufacturer has found it feasible to make a very satisfactory grade of dinitrochlor-benzol, the all-important intermediate for the production of fast sulphur black, a dye now used in vast amounts in this country, especially for hosiery.

OUTPUT OF FINISHED COAL-TAR DYES.

Of prime importance to the numerous categories of consumers of dyestuffs is the question, How far will American color works be able to meet the deluge of demands as the date approaches when the supply of German-made dyes will be entirely exhausted?

There is no question but that from now on each day will see an increased output of American-made coal tar colors.

The large works at Buffalo are now running night and day, busying six hundred operatives. The volume of the output is already double what it was before the war. Manufacture is concentrated upon a few staple dyes, chiefly in demand, the lack of which would be felt most severely by the great textile interests. This firm has brought out a direct black capable of replacing satisfactorily, as far as quality is concerned, both aniline black and sulphur black. It is felt that the use of this dye, along with the rapidly increasing output of aniline available for aniline black, will go far to lessen the hardships attendant upon a complete disappearance of German-made sulphur blacks from the market.

The smaller companies at Newark are straining every nerve to bring their output up to the normal amount manufactured regularly before the war, and hope soon to advance far beyond those figures.

It will probably require more than two months for the Brooklyn plant to attain the volume of output customary before the war and before the disastrous ex-

plosion and fire of last autumn. There is every indication that these works will rapidly expand and become an important factor in the situation.

E. C. Klipstein, of 644 Greenwich street, New York City, is meeting with success in establishing the manufacture of the oldest sulphur color, Cachou de Laval, a fast brown susceptible of many applications, and is extending operations to other sulphur colors.

The American branch of the famous Bayer Company, one of the leading German dyestuff firms, is located at Rensselaer, N. Y. It has been practically closed for some months, but will resume active operations on July 1. Prior to the war the firm manufactured nigrosines, alkali blue and a few other colors especially in favor in the American market. The intermediates required were imported from Germany. The company now plans to resume the manufacture of the same colors, making also the needed intermediates from American crudes. The firm will employ 350 operatives, a part of whom, however, will be occupied in the manufacture of coal-tar pharmaceutical specialties owned by the Bayer Company —aspirin, phenacetin, etc.

THE USE OF NATURAL DYESTUFFS.

The combined efforts of these works will unquestionably do much to mitigate the difficulties inevitable upon a cessation of a supply of German dyes. Still, at the best, they can replace for the next few months, or even for a year, only a relatively small quantity of the lacking colors.

This fact has been quickly recognized by large consumers of dyestuffs and by the group of firms devoted to the production of dyewood extracts. The latter are making ample preparations for meeting heavy demands during the coming months. The four establishments extracting American quercitron are in a position to expand their output rapidly. The supply of cutch seems to be fairly adequate. Largely increased amounts of logwood, fustic and Brazil wood have been ordered from the West Indies and southern countries. Some difficulty is encountered in obtaining sufficient freight accommodation. Prices have risen on account of higher freights, lack of practiced woodchoppers, the temporary interruption in the export of logwood from Mexico and the enormously increased demand for dyewoods from Great Britain to meet the dyestuff famine now threatening British textile interests.

The demand for natural dyestuffs by American mills has already set in. One large dyewood establishment has increased its sales by 25 percent during the last few months. Another reports that the current orders for logwood extract are 50 percent greater than during last autumn, orders for quercitron, fustic and cutch have tripled, and those for hypernic (brazilwood, etc.) have doubled.

ESTIMATION OF SUGAR IN URINE BY BANG'S METHOD.*

WM. GRAY, PH. G.

Bang's solution, for the quantitative determination of sugar in urine, introduced to medical and chemical literature about six years ago, has been well received by physicians and analysts in Chicago, and its use as a delicate and very accurate reagent is spreading.

PREPARATION OF BANG'S SOLUTION.

First prepare a concentrated solution of copper sulphate in distilled water, using 250 grams in 1500 cc. of water. The copper sulphate should be chemically pure and contain 5 molecules of water. The amount of copper present should be determined by electrolysis. After the determination of the exact amount of copper in the solution, a calculation should be made as to the number of cc. of solution containing 25 grams of copper sulphate. The number of cc. may be more or less than 150, according to the copper sulphate employed. Let us say, for example, that it takes 154.2 cc. instead of 150 cc. You may now place a label on the stock bottle reading, 154.2 cc. equals 25 grams $CuSO_4+5H_2O$.

You are now ready to make the two solutions employed in the reagent.

Solution No. 1.—Weigh accurately into a beaker 500 grams potassium carbonate, 400 grams potassium sulphocyanate, 100 grams potassium bicarbonate and dissolve in 1200 cc. of distilled water at 60° C. The salts should be chemically pure. When dissolved, place in a 2 liter volumetric flask, reduce temperature to 30° C. and run in, slowly, by means of a burette, 154.2 cc. of the concentrated copper solution, shaking the mixture while the copper is being added. This is very necessary to prevent precipitation. Finally add enough distilled water to make 2 liters.

Solution No. 2.—Dissolve 200 grams potassium sulphocyanate and 6.55 grams hydroxylamine sulphate in distilled water at ordinary temperature to make 2 liters of solution.

Allow both solutions to stand over night, then titrate solution No. 2 against No. 1 and balance so that 50 cc. of No. 2 will exactly decolorize 50 cc. of No. 1.

The operation of this reagent is dependent upon the well-known reducing powers of sugar, as found in urine, and of hydroxylamine. When urine containing sugar is added to the alkaline copper solution, the sugar reduces the blue cupric salt to the yellowish cuprous salt, the amount of cupric salt so reduced depending upon the amount of sugar present. The amount of unreduced cupric salt present is then determined by the amount of hydroxylamine solution necessary to complete the entire reduction.

THE APPLICATION OF THE TEST.

1. Measure accurately 10 cc. of urine into a 200 cc. Jena flask.
2. Add to the urine exactly 50 cc. of solution No. 1 (blue copper solution).
3. Heat this flask on a wire gauze over a Bunsen flame so regulated that the flame turns a small spot of the gauze red. Protect flame from air currents.
4. After boiling commences, allow to boil for exactly three minutes.

* Read before Chicago Branch, April 27, 1915.

Caution—If the urine contains more than 0.6 percent of sugar, the blue color will be entirely destroyed. If the blue color turns yellowish on boiling, a smaller amount of urine must be used. Take 2 or 5 cc. of urine diluted with water to 10 cc. and repeat the operations this far.

5. Cool flask and contents to room temperature, quickly, by immersing the flask in cold water.

6. Titrate the contents of the flask with No. 2 solution (hydroxylamine solution) until the blue color is exactly decolorized. This titration should be so conducted that the solution runs from the burette rapidly, but in drops.

7. From the number of cc. of No. 2 solution used, calculate, from the appended table, the sugar in milligrams in the amount of urine used.

BANG'S TABLE OF REDUCTION EQUIVALENTS.

Cc hydroxylamine solution used	Mg. sugar represented	Cc hydroxylamine solution used	Mg. sugar represented	Cc hydroxylamine solution used	Mg. sugar represented	Cc hydroxylamine solution used	Mg. sugar represented
0.75	60.0	13.00	39.0	25.50	23.5	38.00	10.4
1.00	59.4	13.50	38.3	26.00	22.9	38.50	9.9
1.50	58.4	14.00	37.7	26.50	22.3	39.00	9.4
2.00	57.3	14.50	37.1	27.00	21.8	39.50	9.0
2.50	56.2	15.00	36.4	27.50	21.2	40.00	8.5
3.00	55.0	15.50	35.8	28.00	20.7	40.50	8.1
3.50	54.3	16.00	35.1	28.50	20.1	41.00	7.6
4.00	53.4	16.50	34.5	29.00	19.6	41.50	7.2
4.50	52.6	17.00	33.9	29.50	19.1	42.00	6.7
5.00	51.6	17.50	33.3	30.00	18.6	42.50	6.3
5.50	50.7	18.00	32.6	30.50	18.0	43.00	5.8
6.00	49.8	18.50	32.0	31.00	17.5	43.50	5.4
6.50	48.9	19.00	31.4	31.50	17.0	44.00	4.9
7.00	48.0	19.50	30.8	32.00	16.5	44.50	4.5
7.50	47.2	20.00	30.2	32.50	15.9	45.00	4.1
8.00	46.3	20.50	29.6	33.00	15.4	45.50	3.7
8.50	45.5	21.00	29.0	33.50	14.9	46.00	3.3
9.00	44.7	21.50	28.3	34.00	14.4	46.50	2.9
9.50	44.0	22.00	27.7	34.50	13.9	47.00	2.5
10.00	43.3	22.50	27.1	35.00	13.4	47.50	2.1
10.50	42.5	23.00	26.5	35.50	12.9	48.00	1.7
11.00	41.8	23.50	25.8	36.00	12.4	48.50	1.3
11.50	41.1	24.00	25.2	36.50	11.9	49.00	0.9
12.00	40.4	24.50	24.6	37.00	11.4	49.50	0.5
12.50	39.7	25.00	24.1	37.50	10.9	50.00	0.0

PUSHING BEYOND THE HALF-WAY MARK AND WHAT AM I DOING?

ALFRED W. PAULEY, ST. LOUIS, MO.

Chief among the characteristics that carry men past the half-way mark on the road to success is eagerness to keep on learning more about business methods and principles. The ablest men are constant students. They agree with the statement recently made by the treasurer of a large steel corporation: "I have been in business for about thirty years and if my business experience has taught me one thing, it is this: *'That the more a man knows about business principles*

and methods the more he is worth to himself, to his employer, and to his business associates.'"

WHAT AM I DOING?

Any pharmacist can look around in his own line and see prizes only a little distance ahead of him and he can likewise see plenty of pitfalls if he is watchful. To win the prizes and avoid the pitfalls, a man must act under the guidance of sound business principle. A progressive pharmacist should ask himself this question: "What am I doing day by day, week by week, or year by year, to build up my personal assets, my business knowledge and my producing ability? Am I directing my personal career with as much intelligence and foresight as a capable business manager shows in directing the affairs of his concern?"

Retail merchandising and methods employed to accomplish specific results have been problems ever since the beginning of time. The dealers in the time of Nero were as much concerned about retail merchandising as we are to-day and before the Civil War, they likewise had problems to solve similar to those of present date. Yet it seems as though competition was not as keen as it is to-day and in consequence, we are obliged to give this matter more attention from a scientific standpoint than our ancestors did. In consequence we look to the experienced business man for advice. As we look to the experienced business man for advice, so do the prospective customers of retail drug stores depend largely upon the suggestion of your show-windows and show-cases; therefore it is essential that in connection with salesmanship and advertising, we consider show-case and show-window displays. Salesmanship and advertising are so closely allied that it is almost impossible for us to consider one of these subjects without the other. Advertising is salesmanship plus publicity, while salesmanship is advertising plus getting the order. If it is true that salesmanship and advertising are so closely allied that we must consider them jointly, then we must likewise consider the silent factors, namely, the window and show-cases.

Before we go into this matter any further, let us consider the elements of a sale, and the steps to a sale.

Elements of a sale
- Salesman
- The Article or Merchandise
- The Purchaser

Steps to a sale
- Secure Attention
- Inspire Confidence
- Create a Desire

From the foregoing remarks we plainly see that there is a direct relation between the salesman and the silent salesman. Therefore we should consider the silent salesman, namely, the show-window and the show-case, very important factors and in connection with these factors there are such things as decorating, illuminating, special displays, backgrounds and signs to be considered. The show-windows and show-cases really act as suggestions and work in with your general line of advertising, and therefore your windows should be made up so as to back up your newspaper or circular advertising. You may advertise in the very best way, without the desired results, and take that same medium and sup-

plement it by a window display, and a show-case display, and get far better results, as we all know that we are dealing mainly with the human mind through the medium of suggestion. Suggestion is found in its simplest form in the association of words. The name *Ingersoll* suggests a watch, *Colgate* suggests soap, *Ford* suggests motor car, because by long familiarity with these combinations we have come to think of one part in connection with the other, and it is almost impossible to separate them. It may be noted in passing that the particular word suggests the general but that the general does not always suggest the particular individual. Watch does not necessarily suggest *Ingersoll* nor motor car, *Ford*. All words, however, have their associations. We take common maxims and repeat the first part of it and the mind implies the rest. "All's well,"— "It is an ill wind,"— "Early to bed, early to rise," and so forth. In a novel it is no longer necessary to put at the end "they are married and lived happy afterwards." All we need is the slightest term in the direction of an engagement; not even the spoken "yes"; so with many jokes, the listener fills in the ending from his experience. Suggestion is often used in advertising in similar ways and particularly is this true of show-window and show-case suggestion, it being directly allied with salesmanship and advertising, becoming inseparable for perfect results. Your windows first of all being silent salesmen should be so utilized to bring you fair returns and should be used with the same intent that you have in mind when writing your advertisement; namely, to attract attention, inspire confidence and create desire, which leads on to the sale. Your results will be in proportion to the attractiveness of your display. This does not necessarily mean that you must spend a great amount of money to put in fancy displays, for a display may be made attractive by arranging the merchandise so as to appeal to the customer, and the customer once attracted into your store, may add materially to your sales, provided proper salesmanship is exercised. You therefore must direct your attention to the method of decorating and arranging your merchandise in a tasty and attractive manner, giving due consideration to color harmony. Every pharmacist should have a general knowledge of the principal colors used in decorating and apply the rules of harmony and contrast, their formation and influence upon the eye. Psychological experiments prove that red is a color which atttracts best. When we look upon a painting, red is a color which we see first. As we look along the railroad yards at night, how plain the red lights up above the signals are; red, therefore, is one of the essential colors in making attractive displays. Red and green harmonize well; yellow and green likewise; yellow alone is a pretty color; orange contrasts with black; purple looks rich with gold; green harmonizes with yellow; pink is a good summer color; blue is a very soothing color; gold contrasts with any dark color; while black is very heavy and alone does not make up well; while white is always appropriate and can be combined with practically any color and harmonize.

LIGHTING.

The show-windows properly illuminated will add materially to the attractiveness of your display; money spent for proper illumination is well spent. Arrange your lights in your show-windows so as to avoid shadows.

BACKGROUNDS.

With your windows enclosed, it will not be necessary to build special backgrounds, provided they are made of attractive material. Otherwise they should be decorated with a background similar to that which should be used in open windows. Special displays should be made from time to time which you should plan before you trim your windows, and considerable thought given to same in order that special displays may serve as special attractions: Easter displays with chickens and rabbits; Fourth of July displays; Thanksgiving displays; Washington's Birthday displays all serve as good advertising mediums, using in connection merchandise that is seasonable.

SIGNS.

Signs are absolutely necessary for every window display as a show-window without a sign is like bread without butter. All window displays should have this silent salesman talk; prominently displayed in the way of a sign. Window strips are exceptionally good for bringing out special features in connection with the soda fountain, cigars and sundry items.

INTERIOR DISPLAY.

Interior display of both show-case as well as general decorations is usually neglected by the average druggist and these features should have careful consideration as the attractiveness of the store depends largely upon the manner in which the interior is decorated. While the main interior decoration should consist of well arranged show cases, yet displays on your show-cases add materially to the attractiveness of your displays, giving it this "merchandisey" effect that a commercial drug store of to-day is endeavoring to have. Then let us repeat what we have already said in just a few words: Advertising supplements salesmanship; show-window displays supplement advertising; show-case displays supplement show-window displays.

NOTE ON THE USE OF COLLOIDAL IRON IN THE DETERMINATION OF LACTOSE IN MILK.*

REUBEN L. HILL.

(From the Department of Physiology and Biochemistry, Cornell University Medical College, Ithaca.)

The method described below has the advantage of being within the reach of the ordinary laboratory student; it requires comparatively little time and gives very accurate results.

In clarifying the milk, a 10 per cent solution of colloidal iron (dialyzed ferric hydroxide) is used. By adding the proper amount of colloidal iron, all the proteins of the milk are completely precipitated and can be rapidly filtered off leaving a perfectly clear colorless filtrate.

* Journal of Biological Chemistry, March, 1915, 175.

The method is as follows: To a 10 gram sample of milk, which has been diluted to about 25 cc., about 3 cc. of a 10 percent solution of colloidal iron are added. The amount of colloidal iron necessary depends upon the composition of the milk and can be accurately determined by adding the last portion drop by drop, and agitating after each addition.

If the precipitation is complete, a clear supernatant liquid separates out from the flocculent precipitate; if too little has been added, the supernatant liquid will appear milky; if too much, it will have a reddish tinge.

The sample is next filtered into a 100 cc. volumetric flask, and the precipitate thoroughly washed with distilled water until the filtrate and washings aggregate about 100 cc. The flask is then filled to the mark and the percentage of lactose determined by Benedict's quantitative method.[1] About 16 cc. of the diluted sample will be required to reduce completely 25 cc. of Benedict's quantitative solution.

A very convenient method of analysis is given by Cole,[2] in which a 4 ounce flask is used instead of an evaporating dish. The wide mouthed Jena 150 cc. flat bottomed flasks are very convenient for the determination. The flask is fitted into the 2.5 inch ring of a retort stand, and the height above the Bunsen burner so arranged that the contents of the flask will be kept briskly boiling with a small flame. Two flasks can be run simultaneously from the same stand.

Three to four grams of anhydrous sodium carbonate are dissolved, by means of heat, in 25 cc. of *twice diluted*[3] Benedict's solution, to which a little powdered pumice has been added. About 14 cc. of the sugar solution are then rapidly added from a burette. Boiling is continued for at least one-half minute before the addition of more lactose solution.

When reduction is complete the supernatant liquid will have a slight yellowish tinge to which the blue color very slowly returns. If the end-point has been underestimated, it will have a blue or greenish tinge that rapidly becomes bluer. With a little practice, and by adding the last portion a drop at a time, and boiling one-half minute after each addition, the end-point can be determined to within one drop.

Twenty-five cc. of Benedict's quantitative solution are completely reduced by 0.0676 of a gram of anhydrous lactose. Since the milk has been ten-fold diluted, 0.0676 divided by the number of cc. of diluted lactose solution used, multiplied by ten, will give the percentage of lactose in the milk. If 16.1 cc. of lactose solution were required, then 16.1 : 0.0676 : : X : 10 = 4.20 percent.

That very accurate results can be obtained by using this method may be seen from the following tables. Table I shows the comparison between duplicate samples of different milks. Table II shows the effect of the addition of the small quantities of lactose to the milk before analysis.

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[1] S. R. Benedict, Jour. Am. Med. Assn., lvii, p. 1193, 1911. P. B. Hawk: Practical Physiological Chemistry, 4th edition, Philadelphia, 1912, p. 386.

[2] S. W. Cole: Practical Physiological Chemistry, St. Louis, 1914, p. 53.

[3] I prefer to dilute 25 cc. of Benedict's solution to at least 50 cc., for I obtain a more accurate end-point with dilute than with concentrated solutions.

TABLE I.

Comparison between duplicate samples of different milks.

Sample No.	Anhydrous Lactose in Milk 1 Percent	Lactose in Milk 2 Percent	Lactose in Milk 3 Percent
1	4.08	4.19	4.23
2	4.11	4.20	4.20
3	4.10	4.20	4.22

TABLE II.

Effect of the addition of lactose to 10 cc. samples of milk.

Sample No.	Sample ten times diluted, required to reduce 25 cc. of Benedict's Quantitative Solution. cc.	Anhydrous Lactose in Sample gm.	Anhydrous Lactose Added gm.	Added Lactose Recovered Percent
Milk 4				
1	16.7	0.405	None	
2	14.9	0.454	0.050	98
3	15.0	0.451	0.050	92
Milk 5				
1	16.1	0.420	None	
2	14.4	0.469	0.050	98
Milk 6				
1	16.4	0.413	None	
2	7.5	0.902	0.505	97
3	10.2	0.664	0.2525	99
4	10.1	0.670	0.2525	100.8

A FOLDING PAPER DEMONSTRATING CASE FOR BACTERIAL CULTURES—A PAPER INSET ANIMAL NECROPSY TRAY.

M. R. SMIRNOW, M D., NEW HAVEN, CONN., IN JOURNAL A. M. A.

A bacteriologist frequently finds occasion to demonstrate cultures of microorganisms, either to student classes within or near the laboratory or at meetings at some distance. In such circumstances it would be desirable to have not only some light and compact receptacle for such cultures, but also one in which the cultures could be shown to the best advantage.

It was for just such an occasion that, in looking about for a proper demonstrating case, I finally invented the form of folding paper display case shown in Fig. 1.

This case is easily made by using a No. 160 white card paper. The design is mapped out, cut and creased, as indicated in Fig. 2. The holes are punched out with a 5/8-inch die. The case is then folded, fastened and put away until it is to be used. When the cultures to be demonstrated are ready they are placed in proper order into the case, and any description desired may be written directly on the face of the case at both its upper and lower margins. All dimensions except

the length are constant for any size display case desired, the length varying with the number of tubes the case is to hold, requiring 1¼ inches for each tube. The height of the case is 6¼ inches and will hold the regulation size culture tube, the cotton plugs of which are best cut down to the mouths of the tubes and sealed with paraffin.

At several meetings where the demonstration of the cultural characteristics of bacteria was desired, I have used a number of these cases of various sizes with excellent success. The advantages of this paper demonstrating case are:

1. It is of light weight, is easily constructed, and is excellently suited to demonstrating purposes.
2. It takes up little room and may be conveyed any distance, packed in a hand bag or suit case.
3. The culture tubes are separated from one another and cannot be broken.

PAPER TRAY.

This necropsy tray is intended as a convenient piece of apparatus for laboratories in which a considerable number of animal necropsies are conducted. It is designed especially with a view of permitting the least amount of handling of the animal. Its oiled paper inset affords no opportunity for the spread of blood or other fluids, and acts as a wrapping material for the remains that are to be destroyed.

The tray proper is constructed of a single piece of sheet galvanized tin and measures 20 by 9 by 1½ inches for rabbits and 9 by 6 by 1½ inches for guinea pigs. The corners of the tray should be finished off by making small flaps from the ends onto the sides, riveting them in place, and soldering the seams on the inside. A double leg holder made of flat spring brass about three quarters the length of one of the ends and five-eighths inch wide is riveted to one end. The brass is made rough on the inner surface to increase it gripping power. This end of the tray is made a full quarter-inch lower than the other end or the sides of the tray in order to permit the side clamps to "ride" on the sides of the tray. The sides are somewhat lipped or flattened on their tops, measuring one-quarter inch in width. At the end farthest from the leg holder is soldered a corrugated strip of galvanized tin, about six inches in length and one-quarter inch wide, fitting exactly over this lipped surface. These corrugations, together with a spring brass clamp, are to act as leg holders for the forelegs of the animal, automatically adjusting themselves to any size animal.

This clamp is constructed of spring brass. It is made in the manner illustrated and fits loosely over the lipped edge of the side of the tray. The square portion of the clamp must be heated to permit bending, as spring brass cracks and breaks instead of bending at acute angles. The end of the clamp is so constructed that it will allow free play in its movement over the corrugations except when there is some pressure underneath the curved portions of the clamp, at which time it should catch and hold firmly.

The paper inset is best made of No. 160 oiled paper, cut to size and folded to fit the tray. All its sides are folded 1½ inches from the edge of the paper, and the corners turned to one side or the other.

The tray is simple in construction, costs very little and can be used indefinitely,

as there is nothing that requires special attention. The only things that might possibly need replacing are the brass clamps, which can be turned out by any laboratory technician. The paper insets can be folded by hand or can be supplied in quantities at little cost by some paper box manufacturer.

Though from a sanitary standpoint no special advantage can be claimed for this tray over the ordinary piece of board, newspaper and nails, always used in bacteriologic laboratories, yet the tray described acts as a much better piece of apparatus for purposes of demonstration, and adds to the general neatness in laboratory technic.

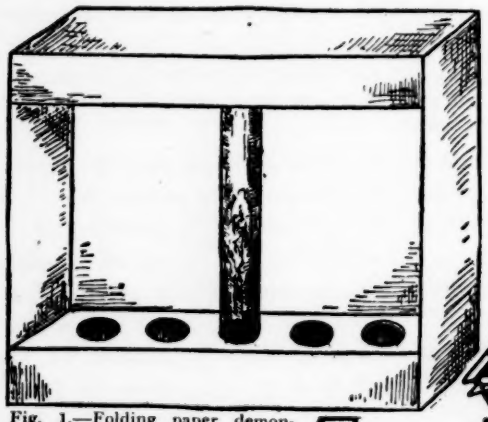


Fig. 1.—Folding paper demonstrating case for bacterial cultures

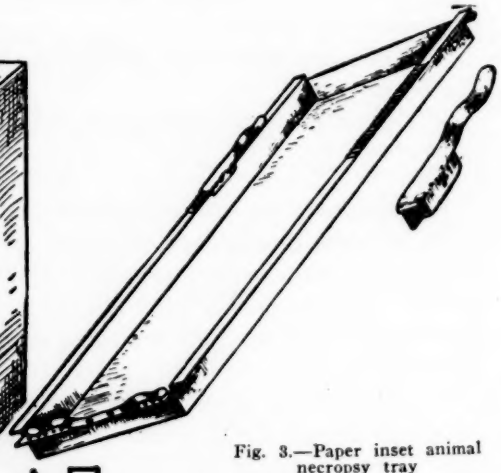


Fig. 3.—Paper inset animal necropsy tray

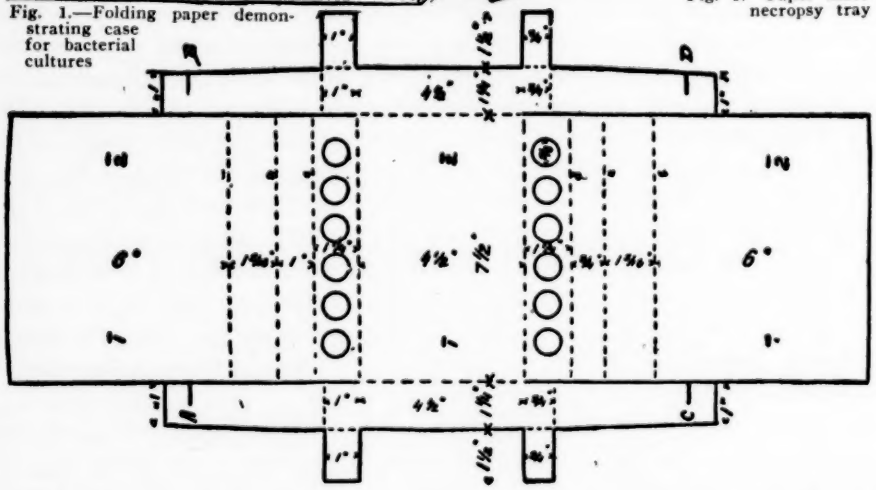


Fig. 2.—Plan of demonstrating case. A 160-pound white bristol cardboard is used. The design is mapped out according to the dimensions indicated. The cardboard is cut on all solid lines except slits marked *A, B, C and D*, also 1, 1, 1 and 2, 2, 2, which are to be done later. All dotted lines are creased with some blunt instrument, the cardboard being placed over soft wood. As many apertures as are desired are punched out, 1¼ inches for each being allowed. All creased lines are bent forward except *a, b, c, d, e* and *f*, which are to be bent backward, and are folded as in illustration. The flaps *A, B* and *C, D* should overlap; slits are cut in opposite direction, as indicated, so that they will properly lock. With a sharp instrument are cut small slits 1 and 2, which will go through three thicknesses of paper that make up the back of the case, and by which the whole is fastened with ordinary paper fasteners.

CURRENT REVIEW OF PHARMACEUTICAL JOURNALS FOR MARCH, 1915.*

E. FULLERTON COOK, P. D.

In this review, with only one or two exceptions, original articles have been abstracted.

A number of papers not referred to, dealing with scientific subjects, are printed this month, but the majority of such papers are reprinted from the Journal of the A. Ph. A. or taken from other Association proceedings.

Much attention is given this month in the American journals to discussion and explanation of the Harrison Act. The Stevens Bill, which is expected to control the "cut rate" evil also occupies attention editorially and in discussion.

In most journals a large share of space is devoted to commercial questions. Papers on salesmanship, accounting, collecting bills, system, buying, etc., etc., are predominant, and the soda fountain and its needs are also given an important place.

The journals in this respect reflect the condition of the drug business at large and this is not altogether a cause for discouragement since business methods must be improved in many stores if they would continue to exist, and we are all seeing at least a few stores where the best professional ideals are maintained and made a financial success through the application of sane and efficient business principles.

The following abstracts were selected as of sufficient interest to report:

AMERICAN DRUGGIST AND PHARMACEUTICAL RECORD.

Toilet Preparations (Page 98).—F. T. Gordon starts a series of articles on this subject, the paper in this issue being devoted chiefly to a general consideration with advice to the would-be manufacturer.

PRACTICAL DRUGGIST.

The Cultivation of Medicinal Plants.—By Fred B. Kilmer (P. 20). This is the first of a series of articles on this subject, which is of rapidly increasing importance. Dr. Kilmer reviews the work of the U. S. Department of Agriculture in this field, through the Bureau of Plant Industry, and also tells of the much more extensive development of drug cultivation in Europe. A few American manufacturers have been studying these problems and growing some drugs on a commercial scale, and he predicts that if manufacturers of medicinal products are really interested in getting better drugs, they can do so through systematic, scientific investigation and experimental cultivation, but this in some instances may require years of work.

THE AMERICAN PERFUMER.

This journal is running several interesting articles in serial form. The titles are *How Flower Concretes are Made, The Soap-Making Industry*, by Dr. E. G. Thomssen, and *Vanilla Beans*, by Wallace Mawhey. While these may not be of especial value to retail druggists they are a valuable addition to the literature on these subjects.

THE WESTERN DRUGGIST.

Several excellent articles on the business side of pharmacy are found in this issue. *Letters that will collect your accounts* (Page 75) is the title of one. In this article five form letters

* Read before Philadelphia Branch, April 13.

are given and suggestions for using them. *The making of a 100 Point Salesman* (Page 77) is also an article which will be of interest to many.

MERCK'S REPORT.

Perfumery and the Chemist, by Edward T. Beiser (Page 81). A short review, in popular style, of the development of synthetic chemistry in the field of perfumery. Many of the more common artificial perfumery materials are mentioned and their chemistry and method of production briefly outlined.

BULLETIN OF PHARMACY.

(Page 110.)—A symposium on *The best way to secure a mailing list* occupied an important place in this month's issue. The giving of a small prize, such as a calendar, pencil, etc., on the return of a coupon or card which has been mailed or distributed in the district seems to be the favorite method of obtaining a valuable mailing list.

DRUGGISTS' CIRCULAR.

(Page 153.)—The subject of *Toilet Cream manufacture* is discussed by H. C. Bradford and working formulas published for "Theatrical" "Make-Up," "Oxygenated," and "Cocoa Butter" Cold Creams, also for "Satin Cream" and Cucumber Cream and Jelly.

The formula for "Satin Cream" is unusual and may be of value to the members. It is:

Pure, sweet unsalted lard	220 gm.
Potassium hydroxide	31 gm.
Alcohol, 60 percent	10 gm.
Water	90 gm.

Dissolve the KOH in the water, pour off the clear liquid and mix it with the lard in a warm pan. Finally work in the alcohol in portions. The fat is largely saponified and the product is used chiefly for the removal of soot, dust, travel stains, etc., by being applied freely and then wiped off with a cloth.

(Page 201.)—Here will be found an interesting article on the *Drug Store Library,* by Frank Farrington. Emphasis is especially laid upon the necessity of having a good business library, books on advertising, window trimming, salesmanship, management, origin and manufacture of goods, etc. He advises proprietors to subscribe to a good trade paper for their clerks, having it sent to their homes.

(Page 203.)—Mr. M. P. Gould discusses the possibilities of advertising for a retail druggist, he pointing out the conditions under which each form of advertising may best be used.

THE PHARMACEUTICAL ERA.

(Page 97.)—Editorially the Era reviews the purposes, scope, and provisions of the Harrison Anti-narcotic Law, stating that in its application to the drug trade it is the "most important legislation ever enacted in this country."

(Pages 101 to 113.)—The "Act" and all regulations to date, issued by the Department are copied in full. An extended list is also given of official and proprietary preparations containing Opium or Coca or their derivatives which are affected by the Law.

AMERICAN JOURNAL OF PHARMACY.

The Proper Time to Collect Sanguinaria (Page 97).—O. A. Farwell of Parke, Davis & Co. made a number of examinations of Sanguinaria collected at different seasons of the year and confirmed the conclusions of Drs. Homerberg and Beringer, published several years ago, in which they stated that the rhizome was richest in alkaloid "immediately after flowering" and not "after the death of the foliage," the time for collection specified in the Pharmacopœia.

THE PACIFIC PHARMACIST.

An abstract from the Consular Report calls attention to the many recent new uses for Infusorial Earth. These consist in its use as an absorbent for nitro-glycerin in the making of dynamite, also as a non-conductor of heat in pipe coverings and fire-proof buildings, as an absorbent for liquid manures for the production of artificial fertilizers and, when boiled with shellac, as a suitable material for talking machine records.

N. A. R. D. JOURNAL.

The Cultivation of Medicinal Plants (Pages 1111, 1165 and 1218) is considered by taking up individual drugs and compiling the available information from Government Bulletins and from published articles and books by those who have been studying and experimenting on this subject.

The Weekly Legislative News-Letters, by J. Leyden White, are always interesting and of much assistance to pharmacists in keeping in touch with National legislative programmes and also in understanding the purpose and scope of proposed new laws.

PHARMACEUTICAL JOURNAL OF ENGLAND.

The Chemical Industries of Germany.—By Prof. Percy Frankland (Page 353). The tremendous importance of the chemical industries of Germany is pointed out, figures being given to show production in recent years. For instance, 11,000,000 tons of crude potash salts was marketed in 1912, valued at about $44,000,000.

The statement is also made that it is believed Germany is now independent in respect to nitrate supply, since she has perfected a process whereby Ammonia is produced from hydrogen and atmospheric nitrogen under a pressure of 200 atmospheres and at 500° C. in the presence of a catalyst. The Ammonia is then converted into Nitric Acid by burning it in air in the presence of a catalyst.

Other figures are given to show the importance of the production of explosives, artificial silk (valued at $15,000,000 in 1912), synthetic organic chemicals, including dye-stuffs, etc.

REPORT OF COMMITTEE ON UNOFFICIAL STANDARDS.

The following portion of the report of the Committee on Unofficial Standards relates to certain crude drugs and chemicals suggested for inclusion in the next revision of the National Formulary, and by order of the Council is published in the Journal in order to afford opportunity for discussion before the standards proposed are finally adopted.

Manufacturers, importers, analysts, and others interested in any of the proposed standards, are requested to send their criticisms and comments to the chairman of the committee, George M. Beringer, 501 Federal St., Camden, N. J.

(Continued from May Issue)

CHIRATA.

Chirata

1. The dried plant of *Swertia Chirayita* (Roxburgh) Hamilton (Fam. *Gentianeceae*).

2. Smooth; root simple, about 7 mm. thick near the crown, stem about 1 m. long, externally yellowish or purplish-brown; cylindrical near the base, quadrangular and slightly winged above, with numerous opposite, ascending branches; wood yellowish, thin, enclosing usually a large yellowish easily separable pith; leaves opposite, sessile, ovate-lanceolate, entire, five-nerved, about 6 cm. long; flowers numerous, panicled, small, with a four-lobed calyx and corolla, capsule ovoid, acute, one-celled, many-seeded; odor slight; taste intensely bitter

3. *Average dose.*—1 gm. (15 grains).

CONDURANGO.

Condurango.

1. The dried bark of *Marsdenia Condurango* Reichenbach filius (Fam. *Asclepiadaceae*).

2. In single quills or transversely curved pieces, usually from 4 to 13.5 cm. in length; bark 1 to 6 mm. in thickness; outer surface light grayish-brown to dark brown, nearly smooth and with numerous lenticels, or more or less scaly and considerably roughened, the scales soft, occasionally with brownish-black apothecia of a fungus; inner surface grayish-white or light brown, longitudinally striate; fracture short and granular or short-fibrous; odor slightly aromatic, especially marked in the fresh drug; taste bitter and aromatic.

3. Under the microscope sections of Con-

durango show a corky layer consisting of several rows of thin-walled cells, frequently with yellowish-brown contents; a layer of phelloderm of 8 to 10 rows of cells, containing either starch grains or membrane crystals of calcium oxalate, the latter in prisms, 0.010 to 0.035 mm. in length; a primary cortex of collenchyma containing chloroplasts, starch grains, or rosette aggregates of calcium oxalate, 0.015 to 0.040 mm. in diameter; a pericycle or pericambium of tangentially elongated parenchyma cells, with groups of bast-fibers and laticiferous vessels in an interrupted circle; middle bark with large groups of stone cells varying from nearly isodiametric to elongated, sometimes very irregular in form; inner bark with medullary rays 1 to 2 cells wide, numerous laticiferous cells accompanied by small groups of sieve cells, parenchyma containing either starch grains or rosette aggregates of calcium oxalate, and an occasional isolated bast-fiber or small group of stone cells.

4. *Powder*—Light, yellowish-brown; consisting chiefly of fragments of stone cells and parenchyma containing calcium oxalate crystals and starch grains; stone cells chiefly in large groups, the individual cells being more or less irregular in shape and with very thick porous walls, the lumina being usually filled with air; calcium oxalate chiefly in rosette aggregates, occasionally in single prisms, mostly from 0.015 to 0.020 mm. in diameter; starch grains mostly single, frequently 2- to 4-compound, the individual grains being from 0.003 to 0.015 mm. in diameter; bast-fibers non-lignified; very long and from 0.010 to 0.035 mm. in width; fragments of thin-walled latex tubes from 0.015 to 0.025 mm. in diameter and filled with a granular substance; fragments of cork grayish or light yellowish-brown.

5. Macerate 1 gm. of the powdered bark in 5 cc. of cold water; filter and heat the filtrate in a test-tube, it should become very cloudy, but on cooling assumes its original transparency.

6. The yield of ash should not exceed 12 percent.

CONIUM.

Conium.

1. The full grown, but unripe fruit of *Conium maculatum* Linné (Fam. *Umbelliferae*), carefully dried and preserved, and yielding, when assayed by the process given below, not less than 0.5 percent of coniine. After being kept for more than two years, Conium is unfit for use.

2. Broadly ovoid, greenish-gray, the two carpels of most of the fruits separated, each about 3 mm. long and about 1.5 mm. in diameter, ovoid, somewhat curved, the inner, flattened side marked by a deep longitudinal groove, the outer, convex side, with five pale yellow, somewhat crenate ribs, the intervening surfaces wrinkled but otherwise smooth; pericarp without oil-tubes; odor slight, but when triturated with a solution of potassium hydroxide, strong, disagreeable, and mouse-like; taste characteristic, disagreeable, afterwards somewhat acrid.

ASSAY OF CONIUM.

3. Conium, in No. 40 powder, fifteen grammes ..... 15 gm.
Solution of Sodium Hydroxide, fifteen cubic centimeters.... 15 cc.
Purified Petroleum Benzin.
Normal Hydrochloric Acid Volumetric Solution.
Sodium Carbonate Test Solution.
Tenth-Normal Sulphuric Acid Volumetric Solution.
Fiftieth-Normal Potassium Hydroxide Volumetric Solution.

Cochineal T. S. each, a sufficient quantity.

Place the Conium in a 250 cc. Erlenmeyer flask, add 150 cubic centimeters of purified petroleum benzin and then 15 cubic centimeters of solution of sodium hydroxide, insert the stopper securely, and shake the flask vigorously at frequent intervals during six hours. Allow the solution to separate and decant 100 cubic centimeters of the clear benzin solution (representing 10 gm. of the drug) into a separator; shake this out with successive portions of 20 cc., 10 cc., 5 cc. and 5 cc. of normal hydrochloric acid V. S. If a few drops of this last washing gives an alkaloidal reaction with iodine T. S., continue the shaking out with successive portions of 5 cc. each of normal hydrochloric acid V. S. until the alkaloid is all extracted. Collect the acid washing and concentrate by evaporation on a water-bath to 10 cubic centimeters, cool and transfer the liquid to a separator, then add sodium carbonate T. S. in excess. Extract the alkaloid by shaking out with successive portions of 15 cc. each of purified petroleum benzin. Separate the benzin washings and filter into a beaker. Then add exactly 10 cubic centimeters of tenth-normal sulphuric

acid V. S. and stir thoroughly for two minutes so as to mix the acid and benzin solution. Evaporate the benzin layer in a current of warm air, at a temperature not exceeding 60° C. and as soon as the benzin has disappeared, cool, add 5 drops of cochineal T. S. and titrate the acid solution with fiftieth normal potassium hydroxide. Calculate the amount of coniine neutralized by the acid by using the factor 0.0126 and multiply the result by ten to obtain the percentage of coniine in the drug.

4. *Average dose.*—0.200 gm (3 grains).

CONVALLARIA.

Convallaria.

Lily-of-the-Valley Roots.

1. The dried rhizome and roots of *Convallaria majalis* Linné (Fam. *Liliaceae*).

2. Rhizome horizontal, elongated, usually branched, cylindrical, variable in length, 1 to 3 mm. in diameter; externally yellowish-white or pale brown, with a few circular stem scars, and from the under and side portions at the nodes usually arise from 3 to 5 thin, tortuous, dark brown, branching roots; fracture short or fibrous; internally whitish; odor faint; taste sweetish, becoming bitter and acrid.

3. Under the microscope sections of the rhizome of Convallaria show an epidermal layer with a thick outer layer of cutin; a hypodermal layer of a single row of collenchyma; a cortex made up of about 20 rows of parenchyma cells, some of which contain starch and raphides of calcium oxalate; a prominent endodermis, the radial and inner walls of which are strongly thickened and lignified; inside the endodermis is an interrupted circle of collateral fibro-vascular bundles, the woody portion of which has in cross section the shape of the letter "V"; inside the circle of bundles is another interrupted circle of fibro-vascular bundles of the concentric type, the sieve tissue being surrounded by the xylem; the parenchyma cells of the pith separated by large intercellular spaces.

4. Under the microscope, transverse sections of the root of Convallaria show a hairy epidermal layer, a hypodermis of a single row of cells; a cortex of about 6 rows of cells, some of which contain starch, raphides and oil; the cells of the endodermal layer resemble those of the rhizome; fibro-vascular bundles mostly 5.

5. *Powder*—Dark brown; tending to cake on standing; consisting chiefly of cellular fragments and a few starch grains and raphides of calcium oxalate; cells of endodermis with slightly oblique ends and considerably thickened walls, lignified porous walls, fragments of tracheæ with spiral and scalariform thickenings, or with porous walls; starch grains single or compound, mostly nearly spherical, and from 0.003 to 0.012 mm. in diameter; raphides of calcium oxalate few, from 0.020 to 0.045 mm. in length.

CROCUS.

Saffron.

1. The stigmas of *Crocus sativus* Linné (Fam. *Iridaceae*), without admixture of more than 10 percent of the yellow styles and other harmless impurities. Saffron should be kept in tightly-closed containers and protected from the light.

2. Stigmas separate or three attached to the summit of the style; stigmas usually about 25 mm. in length, cornucopia-shaped, of a dark rich red color, the margin dentate or fimbriate; styles about 10 mm. in length, more or less cylindrical, solid, yellowish; odor strong, peculiarly aromatic; taste bitterish, aromatic. When chewed it colors the saliva orange-yellow.

3. Under the microscope the upper end of the stigma shows numerous cylindrical papillæ about 0.0150 mm. in length, among which should occur a few spherical pollen grains, the latter being nearly smooth, and from 0.040 to 0.075 mm. in diameter; occasionally some of the pollen grains have germinated and show pollen tubes.

4. When placed in sulphuric acid, the stigmas should be immediately colored blue, gradually changing to violet, and finally become a deep wine-red color.

5. Add 0.010 gm. of finely powdered Saffron to 100 cc. of cold water, allow it to macerate for several hours and filter; upon adding 10 cc of this filtrate to 100 cc. of water, it should give a distinct, yellow-colored solution.

6. Macerate 0.010 gm. of Saffron in 5 cc. of methyl alcohol; a deep orange color should be imparted to the liquid. Macerate 0.010 gm. of Saffron in 5 cc. of acetone, alcohol, or absolute alcohol; a distinct, lemon-yellow color should be produced. With corresponding quantities of Saffron and ether a very light lemon-yellow color should be produced. With corresponding quantities of Saffron and chloroform a very slight, yellow tinge should be imparted; and with corresponding por-

tions of Saffron and xylene, benzene, carbon disulphide and carbon tetrachloride, the solvents should remain colorless.

7. When pressed between filter paper, Saffron should not display transparent spots due to the absorption of oil.

8. Saffron should not lose more than 14 percent of its weight when dried at 100° C.

9. The yield of ash should not exceed 7.5 percent, and the ash should not be fusible.

CUPRI SULPHAS.

Cupric Sulphate. Copper Sulphate.

1. It should contain not less than 63.61, nor more than 66.79 percent of anhydrous copper sulphate, corresponding to not less than 99.5 percent of the hydrated salt, $CuSO_4+5H_2O=249.72$. It should be kept in well-stoppered bottles.

2. Copper Sulphate occurs as large, transparent, deep blue, triclinic crystals; odorless, of a nauseous metallic taste; slowly efflorescent in dry air.

3. It is freely soluble in cold and very soluble in hot water; it is slightly soluble in alcohol and freely soluble in glycerin.

4. When heated to 30° C. the salt loses part of its water of hydration and is converted into a pale blue, amorphous powder. More water is lost at 100° C. and finally at 200° C. a white, anhydrous powder remains. At a still higher temperature, sulphur dioxide and oxygen are given off, and a residue of black cupric oxide is left.

5. An aqueous solution (1 in 20) has a blue color, and shows an acid reaction with litmus.

6. On placing a drop of an aqueous solution of the salt (1 in 20) on a bright piece of iron, a red film of metallic copper will be deposited.

7. Barium chloride T. S. produces in an aqueous solution (1 in 10) a white precipitate, insoluble in hydrochloric acid.

8. On adding ammonia water to an aqueous solution of Copper Sulphate (1 in 10), drop by drop, a pale blue precipitate of cupric hydroxide will be formed, which redissolves in an excess of ammonia water, forming a deep azure-blue solution.

9. Weigh accurately about 1 gm. of unefflorescd crystals of Copper Sulphate, dissolve it in 50 cc. of distilled water and add 4 cc. of acetic acid and 3 gm. of potassium iodide. The titration of the liberated iodine with tenth-normal sodium thiosulphate V. S., starch T. S. being used as indicator, should indicate not less than 63.61 percent of anhydrous Copper Sulphate. Each cubic centimeter of tenth-normal sodium thiosulphate V. S. used corresponds to 0.015964 gm. of anhydrous copper sulphate ($CuSO_4$).

10. Each gramme of Copper Sulphate, U. S. P., corresponds to at least 39.84 cc. of tenth-normal sodium thiosulphate V. S.

CYPRIPEDIUM.

Cypripedium. Lady Slipper Root.

1. The dried rhizome and roots of *Cypripedium hirsutum* Miller (*Cypripedium pubescens* Willdenow), or of *Cypripedium parviflorum* Salisbury (Fam. *Orchidaceae*).

2. Rhizome of horizontal growth, curved, 3 to 10 cm. long, 2 to 6 mm. thick, orange-brown to dark-brown, the upper side beset with numerous circular, cup-shaped scars, closely covered below with simple wiry roots, varying from 3 to 15 cm. in length; fracture of rhizome short, white, that of roots somewhat fibrous; odor distinct, heavy, valerian-like; taste sweetish, bitter, and somewhat pungent.

3. *Average dose.*—1 gm. (15 grains).

EUPATORIUM.

Eupatorium. Boneset.

1. The dried leaves and flowering tops of *Eupatorium perfoliatum* Linné (Fam. *Compositae*).

2. Usually more or less broken; leaves opposite, the pair united at the base, from 8 to 20 cm. long and 1.5 to 5 cm. broad, tapering regularly from near the base to an acute apex, crenate-serrate, rugosely veined, rough and bright green above, yellowish-gray-green, tomentose and resinous-dotted beneath; flower-heads small, numerous, corymbed, with a campanulate involucre of lance-linear imbricated scales and with from 10 to 15 tubular yellowish-white florets, having a bristly pappus in a single row; odor faintly aromatic; taste strongly bitter.

3. *Average dose.*—2 gm. (30 grains).

EUONYMUS.

Euonymus.

(Euonymus, U. S. P. VIII. Wahoo. Burning Bush Bark.)

1. The dried bark of the root of *Enonymus atropurpureus* Jacquin (Fam. *Celastraceae*) with not more than 3 percent of adhering wood.

2. Usually in transversely curved pieces, occasionally in single quills, 2 to 7 cm. in

length; bark, 1 to 2.5 mm. in thickness; very light in weight; outer surface grayish or light brown, somewhat wrinkled, occasionally transversely fissured from the lenticels and with scale patches of soft cork; inner surface grayish-white, longitudinally striate and somewhat porous; fracture short with silky, projecting, modified bast fibers; odor distinct; taste bitter and acrid.

3. *Powder*—Light brown; starch grains numerous, nearly spherical, 0.003 to 0.012 mm. in diameter; fragments of cork with nearly colorless thin walls; secretion cells with yellowish or brownish amorphous contents; bast fibers very long, with thin non-lignified walls possessing numerous small, more or less oblique pores; numerous fragments of parenchyma containing starch; calcium oxalate in rosette aggregates, 0.015 to 0.035 mm. in diameter, the amount in different specimens showing some variation.

EXTRACTUM CARNIS.

Extract of Beef.

1. The residue obtained from fresh beef broth by evaporation at low temperature.

2. A yellowish-brown to dark-brown, slightly acid, pasty mass having an agreeable meat-like odor and taste.

3. 25 gm. of Extract of Beef diluted to 250 cc. with distilled water yields a nearly clear solution, free from sediment. Portions of this solution should answer to the following tests:

4. 10 cc. of the solution boiled for one minute with 1.5 gm. of purified animal charcoal, the loss by evaporation restored and filtered, the filtrate produces no blue coloration when one drop is added to 3 drops of diphenylamine solution in concentrated sulphuric acid (1:100) (limit of nitrates).

5. 10 cc. of the solution when distributed over sand or asbestos and dried in a flat-bottomed porcelain dish to constant weight in an oven at a temperature of 105° C., yields a residue of not less than 0.75 gm., equivalent to 75 percent of solids in the original sample.

6. If the residue from 10 cc. of the solution be incinerated the ash must not exceed 30 percent of the residue, nor must the sodium chloride in the ash exceed 10 percent of the residue when calculated from the total chlorine as determined by the U. S. P. (Volhard) method.

7. To 100 cc. of the solution contained in a 500 cc. Kjeldahl flask, add 5 gm. of barium carbonate, 100 cc. of water and distil 100 cc., using a connecting bulb, into 10 cc. of half normal hydrochloric acid V. S. Titrate the excess of acid, using cochineal T. S. as indicator, and from the acid consumed by the distillate, calculate the percentage of nitrogen as ammonia. This must not exceed .35 percent of the total solids.

8. Transfer 25 cc. of the solution to a 100 cc. Erlenmeyer flask, add 50 cc. alcohol and shake the mixture thoroughly. When the precipitate has subsided, filter, collect the precipitate upon a 9 cm. counterpoised filter, wash the precipitate three times with a mixture of alcohol and water (2 to 1 by vol.), and then dry it to constant weight at 105° C. The weight of this precipitate must not exceed 10 percent of the total solids. (Reserve the filtrate and washing for the determination of nitrogen.)

9. To an aliquot portion of the alcoholic filtrate from the preceding test corresponding to 1 gm. of the alcohol soluble solids, add 4 cc. of sulphuric acid and evaporate to dryness in a 500 cc. Kjeldahl flask. Determine the nitrogen by the Gunning-Kjeldahl method. The amount of nitrogen thus found must not be less than 0.06 gm.

FÆX COMPRESSA.

Compressed Yeast.

1. White or yellowish-white, soft and easily broken masses, having a characteristic slightly sour odor and not more than a faintly acid reaction to litmus.

2. When examined under the microscope numerous oidium and mycoderma cells and starch grains are seen.

3. Compressed yeast should not be used unless fresh and free from mildew and musty or foul odors.

FERRI HYPOPHOSPHIS.

Ferric Hypophosphite.

1. It should contain not less than 98 percent of pure Ferric Hypophosphite ($Fe(PH_2O_2)_3$=250.90), and should be kept in well-stoppered bottles.

2. A white, or grayish-white powder, odorless and nearly tasteless; permanent in the air.

3. Soluble in 2300 parts of water at 25° C. (77° F.), and in 1200 parts of boiling water; more readily soluble in the presence of hypophosphorous acid, or in a warm, concentrated solution of an alkali citrate, forming with the latter a green solution.

4. When strongly heated in a dry test-tube,

the salt evolves spontaneously inflammable hydrogen phosphide gas, and, on complete ignition, leaves a residue of ferric pyrophosphate.

5. Ferric Hypophosphite is readily oxidized by nitric acid or other oxidizing agents.

6. If to 1 gm. of the salt 10 cc. of acetic acid be added, no effervescence should occur (absence of *carbonate*), and if the mixture be subsequently heated to boiling and filtered, the filtrate should respond to the following tests:

7. The addition of a few drops of silver nitrate T. S. to a portion of the filtrate should, upon warming, cause a brown to black coloration or precipitate. If another portion of the filtrate be added, drop by drop, to an excess of mercuric chloride, T. S., a white precipitate of mercurous chloride is formed upon gently heating.

8. Another portion of the cold filtrate should afford no turbidity with ammonium oxalate T. S. (absence of *calcium*).

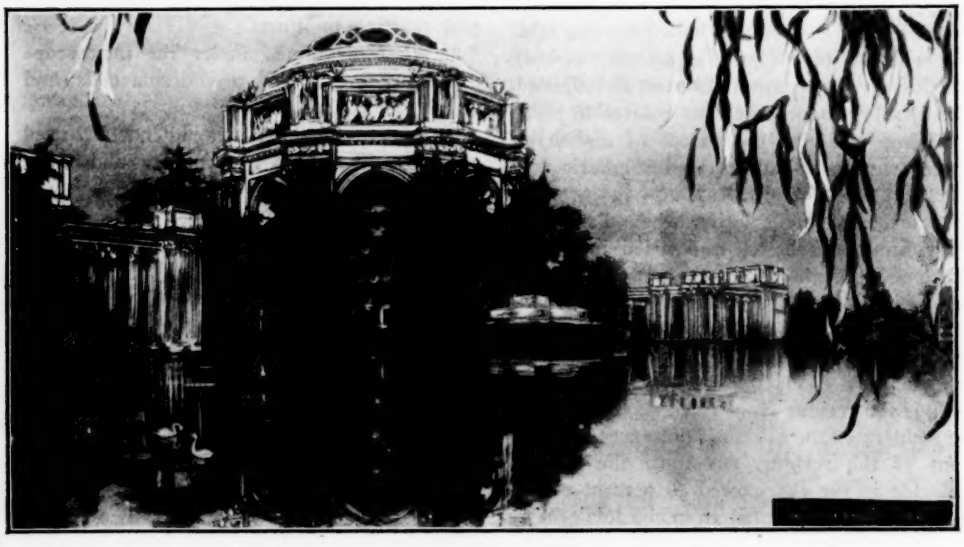
9. Dissolve 1 gm. of the salt in 20 cc. of diluted hydrochloric acid, with the aid of heat, and then add 1 cc. of barium chloride, T. S. Not more than a slight turbidity should be produced (sulphate).

10. If 0.5 gm. of the salt be boiled with 10 cc. of potassium hydroxide T. S., a reddish-brown precipitate will be produced; and if to the filtrate from the latter, slightly acidulated with hydrochloric acid, magnesia mixture T. S. be added, and subsequently an excess of ammonia water, no crystalline precipitate should be produced (absence of *phosphate*).

11. If 1 gm. of the salt be dissolved in about 25 cc. of boiling water by the aid of sufficient hydrochloric acid, added drop by drop, 0.2 cc. nitric acid added and the solution boiled and then a slight excess of ammonia water added, the filtrate from the precipitate should be colorless, and, after acidulating with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals*.

12. To 1 gm. of the salt add 10 cc. of nitrohydrochloric acid and evaporate to dryness. Dissolve the residue in 25 cc. of distilled water and 15 cc. of hydrochloric acid. Transfer it to a glass-stoppered container. Add 4 gms. potassium iodide and keep at 40° C for 30 minutes. Cool and titrate with N/10 sodium thiosulphate, V. S., using starch T. S. as indicator. It should show not less than 22% of Iron. Each cc. of N/10 sodium thiosulphate, V. S., used corresponds to 0.005584 gms. of Iron (Fe) and 0.025089 gm. Ferric Hypophosphite $Fe(PH_2O_2)_3$.

13. *Average dose.*—0.200 gm.=200 milligrammes (3 grains).



Looking across the Lagoon at the Palace of Fine Arts
Panama-Pacific International Exposition

Editorial Notes and Announcements

E. G. EBERLE, Editor.....Columbus, Ohio

All communications for insertion in the JOURNAL, or respecting advertising should be sent to the Editor.

The Association does not accept responsibility for the opinions of contributors. Offensive personalities must be avoided.

Under the rules of the Post Office the JOURNAL can be regularly mailed only to bona-fide paid subscribers. Subscriptions and association dues should be sent to the Treasurer, H. M. Whelpley, 2342 Albion Place, St. Louis, Mo.

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PAPERS FOR THE ISSUES OF JULY, AUGUST AND SEPTEMBER.

As the papers that were read at the Detroit meeting of the American Pharmaceutical Association have nearly all been printed, the editor requests that contributions for the succeeding numbers of the Journal be submitted. It is not desired to interfere with the work of the Sections and doubtless papers read at the Branch meetings will contribute largely to our present needs.

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PHARMACY IN THE ASCENDANT AT NEBRASKA.

It is not often that the honor to deliver a University convocation address comes to a pharmacist, but the University of Nebraska conferred upon me this honor recently by inviting me to deliver the address of the day at the University convocation on Thursday, May 13. The week, May 10 to 15 inclusive, was designated by the University as "Pharmacy Week" in recognition of the promotion of the department of pharmacy into the estate of a full college. Formerly it was a school. Not only has the department been elevated in rank, but it has been given the positive assurance that it may soon vacate its all too inadequate quarters and remove into a building entirely its own. The building assigned to pharmacy is the present chemistry building, in which something over six hundred students are taught chemistry. The building is to be remodeled and adapted to the purposes of a college of pharmacy. Dean Lyman especially is very happy about this because it has been his constant endeavor since the school was first established in 1908 to secure for pharmacy a more equitable place among the University colleges. As valuable as the assigned new building, is the good will toward pharmacy on part of the University Chancellor and the Regents, who have promised their support toward the development of pharmaceutical education on a University basis in Nebraska. To this good fortune is added that growing out of the constructive activity of the Nebraska State Pharmaceutical Association through the work of whose president, who is also State Senator, Senator Brookley, the recently adjourned legislature enacted the law elevating the school of pharmacy into a college of pharmacy. This elevation places pharmaceutical education in Nebraska on a basis comparable with the ranks enjoyed by

other educational departments. This is only another evidence of the upward tendency of pharmaceutical education throughout the country. Not only are the colleges developing, but the state associations are taking more lively interest in adequate educational standards. The state boards, too, are stimulating the upward movement. The President of the Nebraska State Board of Pharmacy introduced a resolution at the Board meeting, held while I was at Lincoln, to make two years of high-school work the minimum academic requirement for eligibility to state examination.

It is some little satisfaction to Minnesota to know that Nebraska has been following the pharmaceutical educational development that has been going on in Minnesota and that it has found it worthy of emulation. Minnesota is especially pleased that Nebraska has now also fallen in line in the matter of recognizing medicinal plant cultivation as a legitimate and necessary activity of a college of pharmacy in its provision of adequate teaching facilities. Nebraska has a very respectable nucleus of a drug garden and is in a fair way soon to inherit room in some of the University plant houses for such work as can only be done in a greenhouse.

FREDERICK J. WULLING.

<>

DR. JOHN B. BOND, SR., RESIGNS FROM ARKANSAS BOARD OF PHARMACY.

After twenty years, faithful and efficient service, Dr. John B. Bond resigned from the Arkansas Board of Pharmacy, when that body met in Little Rock, May 10. No one in Arkansas has devoted more time nor accomplished more for pharmacy in this state than Dr. Bond, and he retires with the honors of faithful service. The action on his part was by the speedometer of time which indicated that rest was not only deserved but mandatory.

S. V. Bracy, of Little Rock, was unanimously elected to succeed Dr. Bond.

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GLYCERIN AND ACETIC ACID MENSTRUA.

In view of the fact that the tax on alcohol has been advanced in England, glycerin and acetic acid are again suggested as menstrua for preparations of drugs. William Wolstenholme suggests a mixture of glycerin, 10 parts; acetic acid, 1 part; water to make 40 parts for menstruum. He gives the name of "Glyncture" to the preparation. Fluidglycerates are also referred to. In this connection it might be stated that the price of glycerin will likely advance considerably, but in any event will be much cheaper than alcohol.

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POTASSIUM SALTS IN JAPAN.

Professor Numura of the Tokio Imperial University states that sugar-cane waste, sawdust and timber will furnish an annual supply of 30,000 tons of potassium salts. Morphine and salicylic acid are now being manufactured in Japan.

The Bulletin Board

THE SAN FRANCISCO MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The local committee of the American Pharmaceutical Association, through the co-operation of the Exposition Tour Service Company of San Francisco, have secured the Bellevue Hotel located at Geary and Taylor streets, San Francisco, as the headquarters of the American Pharmaceutical Association. This is one of the very best hotels in the city, of equal grade with the Palace and the St. Francis. The hotel is in a quiet place, yet within three blocks of the very heart of the business section of San Francisco and within from one to three blocks of the hotel center. The Geary street car passing the main entrance of the hotel, runs direct to the main entrance of the Panama-Pacific International Exposition grounds.

Through the Exposition Tour Service Company, a special rate has been secured for the members, families and friends of the American Pharmaceutical Association, which covers the following service:

Room with private bath at either the Bellevue or one of the first-class hotels in the immediate vicinity of the Bellevue Hotel, to be occupied by two persons, from August 9 to August 14, inclusive.

Transportation by auto or taxi for each person, on arrival, from the depot to the hotel, and a like service on departure.

Transfer of baggage to and from the hotel.

Six tickets of admission to the Exposition

grounds to each person, such tickets good for admission any time on or before December 1, 1915, and may be used by any person. Those not used will be redeemed.

For the individual service above mentioned, a special price of $25 is made for each adult person, payable as follows:

Ten dollars on making the reservation and the remainder, $15, to the committee after arrival.

An attempt will be made to secure special rates for those who may desire to remain for a longer period. It will manifestly be desirable to know at the time of making the reservation whether or not it is desired to stay longer than the period of the convention.

Application for reservation may be made either to the Exposition Tour Service Company, 155 Sutter street, San Francisco, or to Albert Schneider, Local Secretary, 723 Pacific Building, San Francisco. The early applicants will be located in the Bellevue Hotel.

The above is the individual service to each member of the American Pharmaceutical Association. Taking into consideration the high grade hotel accommodations provided and the crowded condition of the city of San Francisco at this time, the above rates are remarkably low.

The details of the entertainment which will be provided for the members of the American Pharmaceutical Association and the other allied pharmaceutical associations will be announced later. The entertainment will include a trolley ride, boat trip on the Bay of San Francisco, visit to the Exposition concessions, grand ball and reception, theatre party, etc.

LOCAL COMMITTEE OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

(Signed) ALBERT SCHNEIDER,
Local Secretary.

HOTELS.

The Bellevue has been selected headquarters of the Association, rates and accommodations are named in the report of Local Secretary Dr. Albert Schneider. For the convenience of members we append a list of hotels that may be corresponded with in advance of the meeting. The rates given will only serve as a guide, as far as our information goes the price named is for room with bath, one person. Rooms, without bath would be lower and the usual advance for more persons in a room:

NEAR CENTER OF BUSINESS SECTION.

Palace, Market and New Montgomery.	$3.00
St. Francis, Powell and Geary.....	3.00
Fairmont, Mason and California.....	4.00
Also American plan.	
Bellevue, Geary and Taylor.....	4.00
Also American plan—add $2 a person.	
Chancellor, Powell and Post.....	2.50
Also American plan.	
Cartwright, Sutter and Powell.....	2.00
Clift, Geary and Taylor.....	2.50
Also American plan—add $2.50 a person.	
Manx, Powell and O'Farrell.....	2.00
Plaza, Post and Stockton.....	2.00
Also American plan—add $2 a person.	
Stewart, Geary and Powell.....	2.50
Also American plan—add $2 a person.	
Dale, 34 Turk.....	3.00
Ramona, 174 Ellis.....	2.00
Argonaut, Fourth and Market.....	3.00
Clark, Eddy and Taylor.....	2.50
Glenn, Turk and Market.....	2.50
Grand, 57 Taylor.....	2.50
Knickerbocker, 589 Post.....	
Leesmont, California and Stockton....	2.50
Martinique, 737 Bush.....	2.50
Montclair, 995 Pine.....	2.50
Regent, 562 Sutter.....	2.50
Also American plan—add $1.50 a person.	
St. Dominic, Bush and Jones.....	2.50
Worth, 641 Post.....	2.50
Zenobia, 947 Bush.....	2.50
Adena, 144 O'Farrell.....	2.00
Alhambra, 860 Geary.....	2.00
Baldwin, Grant and Sutter.....	2.00
Brayton, 50 Turk.....	2.00
Carson, 972 Market.....	2.00
Claridge, 749 Taylor.....	2.00
Cornell, 715 Bush.....	2.00
Cort, 34 Ellis.....	2.00
Court, Bush and Stockton.....	2.00
Also American plan—add $2 a person.	
Eureka, 438 O'Farrell.....	2.00
Garfield, 354 O'Farrell.....	2.00
Also American plan.	
Garland, O'Farrell and Jones.....	2.00
Golden West, Powell and Ellis.....	2.00
Goodfriend, Powell and Geary.....	2.00
Graystone, 66 Geary.....	
Hacienda, 580 O'Farrell.....	2.00
Herald, Eddy and Jones.....	2.00
Kensington, Geary and Jones.....	2.00
Keystone, Fourth and Market.....	2.00
Lankershim, Fifth near Market.....	2.00
Maxwell, 625 Taylor.....	2.00
Mentone, Ellis at Jones.....	2.00
Schwartz, 62 Turk near Market.....	2.00
Also American plan.	
Stanford, Bush and Kearny.....	2.00
Strand, 415 O'Farrell.....	2.00
Sussex,701 Sutter	2.00
St. Andrew, 440 Post.....	2.00
Thoma, Stockton and Post.....	2.00
Towanda, 556 Jones.....	2.00
Turpin, 17 Powell at Market.....	2.00
Victoria, Bush and Stockton.....	
Also American plan.	
Von Dorn, 242 Turk.....	2.00

Windemere, 776 Bush	2.00
Yuba, 1146 Mission	2.00
Adaire, Ellis near Jones	1.50
Adrain, 493 Eddy near Hyde	1.50
Alta, 165 Third	1.50
Arlington, Ellis and Leavenworth	1.50
Also American plan—add $1.50 a person.	
Athmore, 450 Jones	1.50
Avon, 420 Jones, corner Ellis	1.00
Beresford, Mason and Sutter	1.50
Berg, 221 Mason	1.50
Dumas, O'Farrell at Taylor	1.50
Grant, Bush and Powell	1.50
Also American plan—add $1.25 a person.	
Hamlin, 338 Eddy	1.50
Hansa, 447 Bush	1.50
King George, Mason at Geary	1.50
Irwin, Fourth and Mission	
Madison, 364 O'Farrell	1.50
Marymount, Jones and O'Farrell	1.50
Minster, Mason and O'Farrell	1.50
Rand, 364 Eddy	1.50
Ritz, 216 Eddy	1.50
Sequoia, Jones and O'Farrell	1.50
Senate, 471 Turk	1.50
Shasta, 314 Kearny	1.50
St. Cecile, 115 Fell, near Van Ness	2.00
Tallac, 140 Ellis	1.50
Thomas, 969 Mission	1.50
Windsor, 238 Eddy	1.50

For rates and routes the readers are referred to the report of the Committee on Transportation in the March number, page 411.

ENTERTAINMENTS.

The *Allied Drug Interests* of California, organized for the purpose of entertaining the druggists of the world during 1915, have headquarters in the Claus Spreckles Building at Third and Market Streets. D. R. Rees, Chairman of the Publicity Committee, sends the following tentative program of entertainments just to serve as a guide for the fun and frolic in store for all who attend:

Monday, August 9, 1915.

Reception and Dansant at Bellevue Hotel.

Tuesday, August 10, 1915.

Evening Fior D'Italia Dinner

Wednesday, August 11, 1915.

Afternoon—

Ball at California Building,

Evening— P. P. I. E.

Thursday, August 12, 1915.

Afternoon—Card Party for Ladies.

Friday, August 13, 1915.

Morning—10 A. M. Trolley Trip.

1 P. M. Luncheon—Old Faith-Inn—

P. P. I. E.

Afternoon—2:30 to 3:30—

Organ Recital at Festival Hall, P. P. I. E.

SIXTY-THIRD ANNUAL CONVENTION AMERICAN PHARMACEUTICAL ASSOCIATION,

To be Held in San Francisco, Cal., August 9-14, 1915.

Final announcement of Committee on Transportation:

On account of the very low excursion rates to the Pacific Slope and the attractions of the Panama-Pacific International Exhibition at San Francisco and the Panama-California Exhibition at San Diego, the rush travel this season to coast points will be greater than ever before, and for the convenience of our members and to secure their comfort, your Committee has arranged with the Chicago, Burlington & Quincy Railroad to run a special train from Chicago to San Francisco to be known as the "American Pharmaceutical Association Special," on which *no extra fare will be charged.*

Price of ticket good for three months, with stop-over privileges west of Chicago to go and return by any direct route:

From Boston, via N. Y. C. lines, $104.20; other lines, $101.20.

From New York, via N. Y. C. lines or Pa. lines, $98.80; other lines, $94.30.

From Philadelphia, $95.20.

From Baltimore and Washington, $92.95.

From Chicago, $62.50.

From Cincinnati, $70.25.

From St. Louis, $57.50.

From Atlanta, $72.55.

From Savannah, $80.50.

From Jacksonville, $80.50.

From New Orleans, $57.50.

From St. Paul, $63.83.

From Denver, $45.

From all other points at proportionate rates.

To return via Portland an extra charge is made of about $17.50 on each ticket, the exact amount of which can be ascertained from the ticket agent in your city.

Purchase your excursion tickets from your *regular ticket agent,* choosing your own route *to* Chicago, but seeing that beyond that point the route is C. B. & Q. to Denver; Denver & Rio Grande to Salt Lake; Western Pacific to San Francisco.

Route from the Special train will be as follows: C. B. & Q. to Denver, D. & R. G. to Salt Lake City, Western Pacific to San Fran-

cisco, and train will run on the following schedule:

Leave Chicago, Thursday, July 29th, at 11 P. M.

Arrive Denver, Saturday, July 31st, at 7:20 A. M.

Leave Denver, Saturday, July 31st, at 7:45 P. M.

Arrive Colorado Springs, Saturday, July 31st, at 10:28 P. M.

Leave Colorado Springs, Sunday, August 1st, at 10:35 A. M.

Arrive Salt Lake City, Monday, August 2d, at 1:30 P. M.

Leave Salt Lake City, Tuesday, August 3d, at 12:45 P. M.

Arrive San Francisco, Wednesday, August 4th, at 5:45 P. M.

The above provides for a 12-hour stop at Denver during which the local branch of the A. Ph. A. will entertain the party and there will be sight-seeing trips through city and suburbs.

At Colorado Springs the train will be parked for the night and those who rise reasonably early will be able to visit Manitou by trolley and take the carriage ride through the Garden of the Gods (arrangements for this will be made by F. W. Nitardy, Denver member of Committee on Transportation), before the train starts at 10:35 A. M. on its trip through the famous Royal Gorge, via the scenic D. & R. G. R. R. to Salt Lake, where in the afternoon of August 3d there will be a trip (personally conducted by local members of the A. Ph. A.) to the Mormon Temple and points of interest in the city. The train will be parked here for the night and in the morning party will visit the bathing place and amusement park on Salt Lake before boarding the train at 11:45 A. M. for San Francisco. From Salt Lake train is to be run over the Western Pacific through the famous Feather River Canyon to San Francisco.

A pamphlet in relation to above is in preparation and will be mailed to members of the Association.

Members traveling by above train will reach San Francisco in time to attend the sessions of the National Association of Boards of Pharmacy and the Conference of Pharmaceutical Faculties which are to be held on August 5th, 6th and 7th, while those who do not desire to attend these meetings will have these three days and Sunday in which to visit the Panama-Pacific Exhibition or points of interest in San Francisco before the first session of the A. Ph. A. meeting which will be held on Monday, August 9th.

Members upon arrival should immediately register at headquarters, the Bellevue Hotel, where a special rate has been made of $25 for six days for each room with private bath and six exposition admissions. For members who desire cheaper accommodations, rooms can be secured for $1.00 per day upwards, $1.50 per day with bath upwards, by addressing in advance of the meeting the local Secretary, Dr. Albert Schneider, 723 Pacific Building, San Francisco.

Regular Pullman rates will be charged on the A. Ph. A. special, but you must order reservations from W. Bodemann, Hyde Park, Chicago, Ill., the Chicago member of Transportation Committee, which should be ordered *at once* specifying whether upper or lower berth or drawing room is required.

Members must also choose their return routes when buying tickets, see suggestions that follow. The first three are northern routes, via Portland, for which the extra fare is charged.

Suggested routes to return from San Francisco:

Northern Route No. 1—Great Northern Pacific S. S. (no extra charge for berth and meals), or Southern Pacific R. R. to Portland; Great Northern R. R. to St. Paul (side trips through Glacier, National Park, from 1 day, $8.25, to 7 days, $47.50).

Northern Route No. 2—as above to Portland; Northern Pacific to St. Paul, via Livingston (original route Yellowstone National Park, six days, including transportation, hotels and meals, $53.50), C. B. & Q to Chicago, Omaha, St. Louis, Kansas City.

Northern Route No. 3—as above to Portland; Great Northern, or Northern Pacific to Seattle, boat to Victoria or Vancouver, Canadian Pacific, via Glacier, Field (for Emerald Lake and Yoho Valley), Laggan (for Lake Louise), Banff to St. Paul (via Winnipeg if desired), C. B. & Q. to Chicago, Omaha, St. Louis, Kansas City.

DIRECT ROUTES; NO EXTRA FARE.

No. 4—San Francisco to Los Angeles by Southern Pacific or A. T. & S. F. (side trip to Yosemite and Big Trees at special rate to be named in San Francisco), side trip Los Angeles to San Diego for Panama California

Exhibition by A. T. & S. F. R. R. at no extra charge if included in ticket at time of purchase. Salt Lake (side trip through Yellowstone, six days, $53.50, including transportation, hotels and meals), Salt Lake to Denver, D. & R. G., thence by C. B. & Q. to Omaha, Chicago, Kansas City, and St. Louis.

Direct Route No. 5—Same as above to Los Angeles, thence by Southern Pacific R. R. to New Orleans.

Direct Route No. 6—Same as No. 4 to Los Angeles, thence via A. T. & S. F. to Kansas City via Williams (side trip to Grand Canyon, round trip, $7.50), Adamana (for Petrified Forest; livery, $3 each for two persons, $2.50 each for three or more), C. B. & Q, Kansas City, Omaha, St. Louis, Chicago.

By ordering your Pullman reservations as soon as possible from Mr. Wilhelm Bodemann, Hyde Park, Chicago, Ill., you will secure better accommodations and lighten the labors of your Committee.

Respectfully submitted,
For the Committee on Transportation,
THOS. F. MAIN, Chairman.

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SECTION ON COMMERCIAL INTERESTS

The Commercial Section is desirous of papers on the following list of subjects:

1—Meeting mail order competition. A plan outlined.
2—A system of stock arrangement as a help to reduce store expense.
3—Developing the sale of rubber sundries—photographic supplies — stationery—cigars.
4—Possibility of creating a National line of non-secrets, to be prepared by the individual but with common ownership of copyrighted labels.
5—Co-operation in purchases by druggists of a locality. Does it pay?
6—Misrepresentation in merchandising.
7—Advertising the prescription department.
8—Is it advisable to give clerks a percentage of sales.
9—Your own non-secrets, compared with other lines.
10—Window displays that produce results.
11—Teaching salesmanship to clerks.
12—Store fixtures as a help in developing business. What necessary or of advantage.
13—Perfumes—Manufacture of—Basic Material—Care—Selling Pointers.
14—Purchases — What — When — Where—Quantity limits.
15—Store management — Prevention of waste—Goods out of stock, etc., etc.

E. H. THIESING, Chairman,
Gilbert and Lincoln Ave., Cincinnati, O.

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THE HISTORICAL SECTION.

The Historical Section is desirous of papers concerned with early pharmacy in all States. Biographical sketches of pharmacists, letters and other literature, views of old pharmacies and contributions of pharmaceutical interest are solicited. Reports on native drug plants, used in the earlier days, and descriptive methods for making preparations of them, are also asked for.

FREDERICK T. GORDON, Chairman,
2115 Medary Ave., Philadelphia.

Proceedings of the Local Branches

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be *plainly* written, or typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

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BALTIMORE.

The May meeting Baltimore Branch, American Pharmaceutical Association, was held in the Assembly Hall of Hynson, Westcott & Company's Pharmacy, S. E. corner Charles and Franklin Streets, Wednesday, May 19, at 8 p. m., with President E. W. Hodson in the chair.

The regular program was:

THE JOURNALS.

Six of the journals have been assigned to as many different members, and we are to have presented, for our information and dis-

cussion, one or more articles from each. Dig out something interesting from your journal, bring it along and discuss it with us.

A Mystery by the Misses, or Pharmacisters' Promised Pabulum and Palaver.

This is to be the last meeting till autumn, and the pharmacisters are going to make good a partial promise "maiden" January.

On motion of Mr. Muhlhause, the Secretary was directed to send a letter to Mr. John S. Donnett, expressing the sympathy and extending the condolence of the Branch to him in his recent bereavement in the death of his wife.

Only four of the journals were reported on and one of the should-have-been reporters sent in his regrets as to his unavoidable absence and, therefore, became a was-not-reporter, while in the other case, the most important item in that particular journal was pointed out as uninteresting and unentertaining to a gathering in which so many diversified interests were represented.

Miss Sonnenberg read extracts from an editorial commending the Branch's resolution on bettering the Latin of prescriptions and incidentally it was brought out, that the generally accepted pronunciation of a good many medical, chemical and pharmaceutical terms is incorrect and, in speaking, correct pronunciation is not only necessary but also imperative and consultation of a good, modern dictionary is advisable for new words and even for a number of old ones.

"Ouabain" was cited as not being pronounced ou (rhyming with the "moo" of moo cows), but as "wa" (rhyming with jaw) bain.

"Enzyme," not as en-zyme (rhyming with dime), but as en-zim (rhyming with Jim).

The ruling as to allowing physicians to order a repeat of a narcotic prescription by giving an order for its refilling by simply writing the full number of the original on a blank along with the requirements as to registry number, date, name of patient, physician's name, etc., as required for the original, was considered as simplifying things.

Mr. Morgan called attention to an editorial about incorrect weights, and during its discussion, the practice of the average pharmacist to rely indefinitely on the accuracy of the weight, measure and thermometer makers' instruments, was condemned and, inasmuch as the Government Bureau of Standards will examine them for a nominal sum, it was resolved, that, "It is the sense of the Branch that more attention be paid to the accuracy of weights, measures and thermometers and that pharmacists should have them examined at least once by the Bureau of Standards and that they ought to have the weights and thermometers examined occasionally thereafter."

In this connection, it was brought out that supposedly accurate prescription scales are often inaccurate for small quantities and attention should be paid to the quality and condition of them.

A case was cited and corroborated in which it was stated that some years ago, it was not possible, from all the one-ounce graduates in stock at a local jobber's, to get a single one to graduate correctly from three drachms down.

In discussing, with Mr. Meyer, an article on making Syrup Hypophosphites and Syrup Hypophosphites Compound, by using only one hypophosphite, namely, calcium, and sulphates of the other metals, the alkaloids themselves and just enough sulphuric acid, to liberate sufficient hypophosphorous acid to dissolve the alkaloids and leave a necessary excess to insure a stable solution, the precipitated calcium sulphate being filtered out, suggested the possibility of using the same idea in making Elixir of the Glycerophosphates, of course, using calcium glycerophosphate as the source of the glycerophosphoric acid.

It was brought out that it would not be necessary to use scale soluble ferric phosphate if it was wanted for making Elixir Iron, Quinine and Strychnine Phosphates in large quantities.

The correct quantity of solution of ferric citrate could be made or used, and to it the exact amount of sodium phosphate should be added; this solution could be used without the necessity of scaling if the elixir is made from the oils, alcohol, water and syrup.

Mr. Hynson presented several articles from his journal and from a discussion of one of them, it was shown that the one-store pharmacist could compete with the chain stores by buying in quantities sufficient to give him a quick turn-over, thus tying up a minimum amount of money and yielding a greater profit on his capital than by stocking large lots at a greater discount, but at a slower turn-over and actually with less yearly profits on the total investment. Nothing was said as to the chain stores doing the same thing.

The pharmacisters then assisted the phar-

macists to sit in social session while they served salad and so forth, and the Misses' Mysterious "Pharmacisters' Promised Pabulum Palaver" panned out particularly propitious.

The words "panned out" are used because they suggest nuggets, and the luncheon which was served by them was a veritable nugget as was suggested by the remark made by the son of Ham who delivered the coffee and said, "You all had better 'nu get busy."

Just before parting till the October meeting, a motion that "This elaborate spread be spread on the minutes and that the thanks of the Branch be extended to the pharmacisters" was O. K'd by the pharmacists singing or near singing, "So say we all of us."

WM. J. LOWRY, JR., Secretary.

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CHICAGO.

The Chicago Branch of the American Pharmaceutical Association met Tuesday evening, May 18, for the last monthly meeting of this season.

The meeting was called to order by President Craig. The question of delegates to the House of Delegates for the San Francisco meeting came up and the President was instructed to appoint three members as delegates preferably from among those who were reasonably sure of being at the meeting, and who had not been appointed from some other organization entitled to send delegates. The President deferred the announcement of the appointments until later. Our delegation was instructed, however, to offer the following resolution in the House of Delegates:

Resolved, That the question of the deletion of Squibb's and Sun Cholera Mixtures from the N. F. should be reconsidered by the N. F. Committee and that they should be reinstated into the text of the N. F.

The deferred election of a Branch Representative to the Council to fill the vacancy caused by the expiration of the term of Professor A. H. Clark was called for. Professor C. M. Snow was placed in nomination by Professor Day, the nomination being seconded by Mr. Orr. It was then moved, seconded and carried that nominations be closed. Mr. Snow was declared elected to serve as Council member for the Branch for three years from 1914.

Professor W. B. Day responded for the Legislative Committee and reported that the prospect for the final enactment of the State anti-narcotic law was very good, but that the passage of the anti-vending law was not so promising and of the pre-requisite law even less so.

Mr. William Gray, on behalf of the Committee on Practical Pharmacy, read a paper entitled, "Redistilled Water versus Sterilized Distilled Water." He made an especial plea that pharmacists generally should respect the wishes and orders of physicians and when the call came for redistilled water to be prepared to furnish the same and not substitute sterilized distilled water. His paper was well received and discussed and was ordered sent along with a drawing of the apparatus to the editor of the Journal for publication upon approval by the publication committee.

E. N. GATHERCOAL, Secretary.

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CINCINNATI.

The annual meeting of the Cincinnati Branch, A. Ph. A., was held at Lloyd Library, May 11, 1915.

The meeting was well attended, the President's annual address, the Secretary's annual report, the Treasurer's annual report, and particularly the annual reports of the various committees proving instructive and pleasing features.

The election of officers resulted as follows: President, Charles G. Merrell; First Vice-President, J. F. Kutchbauch; Second Vice-President, Louis Werner; Treasurer, Julius Greyer; Secretary, Charles A. Apmeyer; Member Executive Committee, E. H. Thiesing.

The installation of the newly-elected officers followed, each one pledging himself to further the interest to the best of his ability, not only for the local Branch, but also for the parent body.

The membership list of the Cincinnati Branch shows fifty members of record.

CHAS. A. APMEYER, Secretary.

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CITY OF WASHINGTON.

The April meeting of the City of Washington Branch of the American Pharmaceutical Association was held at the National College of Pharmacy, Wednesday, May 28, 1915.

The subject presented for discussion was the "Quality of Some Drugs Examined in the District of Columbia," by Dr. L. F. Kebler, Chief of the Drug Laboratory, U. S. Department of Agriculture.

Owing to the absence of Dr. Kebler, he having been called from the city, the subject was presented by Messrs. Murray, Palkin and Dr. Emery, of the Bureau of Chemistry.

The various products considered were Spirit of Nitrous Ether; Aromatic Spirit of Ammonia; Tincture of Iodine, and several Camphor Preparations (Tincture, Liniment and Soap Liniment), and numerous prescriptions which will be given below in detail.

Much interesting data was presented, and while the results in some cases showed that the preparations were below the standard, several were above. Careless manipulation, careless weighing or measuring of material or the use of inaccurate weights and measures are evident and go to show that the system usually followed in compounding prescriptions and manufacturing preparations by the average retail pharmacist is badly in need of readjustment.

SPIRIT OF NITROUS ETHER.

The samples taken of this product showed from slightly above the standard to as low as ½ of 1% Ethyl Nitrite. In not a single case was it shown that the product was assayed after being manufactured.

The Bureau has conducted many experiments to determine the keeping qualities of this product, and also as to what causes the decomposition, from the results already obtained, the work not yet having been completed, it is very clearly demonstrated that a properly made sample, using official alcohol, will keep for at least six months under the average store conditions. The greatest disturbing element in the decomposition of this product is water, causing hydrolysis to take place, resulting in decomposition in a very short while. The product if kept in small amber containers in a cool place with a trace of potassium bicarbonate present to neutralize any acid if formed, will keep for at least six months.

SPIRIT OF CAMPHOR.

The poorest samples of this product showed respectively —80%, —70%, —60%, —57%, —20%, —18% in camphor content, one specimen contained but 33% alcohol; with this product competition could be readily met and yet show a profit.

LINIMENT OF CAMPHOR.

One specimen examined was short in camphor content 90% and numerous showed —65%, —34%, —31%. The specimen 90% deficient was due to attempting to hurry the solution of camphor by use of a water bath, the container fractured, and the oil was then skimmed from the surface was the excuse offered at the hearing.

LIME WATER.

Many samples were taken, much interesting data was given tending to show that the necessary precautions with reference to manufacture and keeping of the product were ignored or neglected, one specimen was deficient in calcium hydroxide 99%, several were deficient —70%, —40%, —30%.

TINCTURE OF IODINE.

One specimen was 68% short in potassium iodide content, several contained but a trace, and others contained none; shortages of Iodine of —20% and —18% were common. At the hearing, one druggist admitted that his tincture of iodine was made by dissolving the contents of a one ounce bottle of iodine, without weighing same, in one pint of commercial alcohol, and that he used no potassium iodide. There was one specimen that contained —7% potassium iodide.

SPIRIT OF AMMONIA AROMATIC.

Considerable variation in both water of ammonia and ammonium carbonate content was found, clearly indicating the use of efflorescent ammonium carbonate and a deficiency in strength of the ammonia water that was used, not a single one showed that they had assayed the product after making. One specimen contained nearly three times the amount of ammonia gas required, clearly indicating the use of stronger water of ammonia instead of water of ammonia.

The following prescriptions were summarized, and while the data given shows some variations, as a whole they were better than previously shown with reference to compressed tablets on the market:

No. 1—16 Samples.

Antipyrine ..... 2 grains
Sodium Salicylate ..... 5 grains
Make 10 such capsules.

Variation, from 1.28 to 2.17 grains, or — 36% to + 8% in antipyrine and 4.49 to 6.22 grains, or — 10% to + 20% in sodium salicylate.

No. 2—18 Samples.

Antipyrine ..... 2 grains
Sodium bicarbonate ..... 10 grains
Make 10 such powders.

Variation, from 1.9 to 2.7 grains, or — 5% to + 35% in antipyrine and 4.9 to 10.2 grains, or — 50% in sodium bicarbonate.

No. 3—20 Samples.

Phenacetine ..... 5 grains
Salol ..... 5 grains

Make 10 such capsules.

Variation, from 4.2 grains to 5.46 grains, or — 16% to + 11% in phenacetine and 3.81 to 5.25 grains, or — 24% to + 5% in salol.

No. 4—20 Samples.

Salol ..... 3 grains
Quinine sulphate ..... 3 grains

Make 10 such capsules.

Variation, from 2.17 grains to 3.44 grains, or — 27% to + 15% in salol and 1.79 to 3.56 grains, or — 40% to + 18% in quinine sulphate.

No. 5—55 Samples.

Acetphenetidin ..... 3 grains
Bismuth subnitrate ..... 3 grains
Sodium bicarbonate ..... 10 grains

Make 10 such powders.

Variation, from 1.5 grains to 3.8 grains in acetphenetidin, or — 50% to + 27%.

Prescription No. 1 showed two substitutions of acetanilide for antipyrine; under no conditions was this excusable. No. 5 likewise showed two substitutions of acetanilide for acetphenetidin and one for bismuth subnitrate, subcarbonate being used. If the prescription had called for a liquid in connection with the combination the pharmacist would have been justified in using bismuth subcarbonate.

In summing up and considering the excuses offered for the many shortcomings, many were cited that were given at the hearings. All of them tended to show the lack of proper checking system for both weights and measurers and also methods in compounding and manufacturing. The lack of good judgment in many cases likewise was demonstrated, as for example, the cleaning of weights with sand soap and hydrochloric acid; the weighing of material on paper without previously counterpoising the paper; the use of weights for years without testing same as to accuracy, or the replacing with new ones. These conditions no doubt account for the inaccuracies in compounding.

Much discussion followed, numerous questions were asked and answered by the gentlemen from the Bureau of Chemistry which developed a general feeling that much good would be accomplished from the presentation of the true conditions, as found by careful investigation.

S. L. HILTON,
Secretary

NASHVILLE.

The Nashville Branch, A. Ph. A., held its regular meeting at Bloomstein's Hall, April 14, with President E. F. Trolinger in the chair. Following the approval of the minutes a communication was read from Professor H. P. Hynson in regard to abolishing the House of Delegates. A free discussion of this followed. The consensus of opinion was that the House of Delegates being a new organization should be tried out thoroughly before abolishing it. The idea of bringing the State Associations in closer touch with the American Pharmaceutical Association was favored.

The passage by the State Legislature of a stringent law regulating the sale of alcoholic liquors by druggists was announced. The bill provides that the amount kept on hand at no time can exceed one percent of the value of the stock; that it can be dispensed only on the written prescription of a licensed physician who has visited the patient at his domicile, and that both druggist and physician must preserve records of the prescription for two years. The enforcement of the law is made the duty of the State Food and Drug Inspector. Recent rulings on the Harrison Law were read and discussed.

Dr. J. O. Burge read abstracts referring to flavorings for cod-liver oil, para dichlor benzine, the new insecticide, and on a new test for cancer. W. R. White called attention to the recent discovery by Dr. Rittman of a new process for obtaining toluol and benzole from petroleum oil and its possible bearing on the dye industry of this country; to the discovery of a new alkaloid called struxine from nux vomica by Hugo H. Schaefer, and to the use of scopolamine hydrobromide and morphine in producing a semi-conscious effect on labor patients, called Twilight Sleep. Dr. Ruddiman seriously questioned its advantages over the usual methods of treatment.

W. R. WHITE, Secretary.

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NEW YORK.

Minutes of the regular meeting of the New York Branch of the American Pharmaceutical Association, held in the New York College of Pharmacy Building, April 12, 1915, President Roemer in the Chair.

Upon motion, reading of the minutes of preceding meeting was dispensed with.

Treasurer's report received with thanks.

Mr. McElhenie, member of the Council being absent, no report was received.

Reports of Standing Committees:

Membership—Absent.

Legislation and Education—Absent.

Fraternal Relations—Chairman Berger reported progress.

Progress of Pharmacy—Professor Diekman read a very interesting report covering the following subjects: Adigan, a new digitalis preparation; Grotan, a powerful disinfectant; the use of magnesium sulphate in tetanus; the use of hydrazin and dioxim in a delicate test for iron; Histamin obtained from ergot, its uses and properties; a method for the determination of silver in colloidal preparations; a method for the rapid determination of heavy mineral oil in vegetable oils or paints; purity and manufacture of acetyl-salicylate of calcium; the disturbing influence of alcohol and other fluids on certain reactions; a criticism of the aldehyde test in chloroform; Lavonat, a preparation used for infections of mucous surfaces; an abstract of a very interesting and exhaustive article on hair-dyes, as used past and present. Dr. Ditmar-Graz in Der Seidenfabricant, 1914, gives exhaustive directions for manufacture and application as well as condemnation of those containing lead or silver and some organic compounds.

Messrs. Lascoff, Diner, and Diekman then spoke relative to the decease of Thomas F. Raymow, and the President appointed Messrs. Diner, Raubenheimer and Hostmann a committee to draw up a suitable set of resolutions.

Mr. Thomas F. Main then addressed the members, explaining what arrangements were being made by the Committee on Transportation for the San Francisco Convention.

Communications from Secretary Day and Professor Remington were read.

Dr. Mayer suggested that a dinner be held to celebrate the closing of the season, and President Roemer appointed Messrs. Mayer, Mansfield and Hostmann as a committee to make arrangements therefor.

Dr. Leo Fried then read a paper on "Data and Method of Assay of Iodine Ointment." After discussion by Messrs. Diner, Weinstein, Mayer, Turner and Raubenheimer the same was received with thanks.

President Roemer then presented a paper entitled, "Phenomena of Drug Action." This paper called for a very spirited discussion, taken part in by many of the members present.

After extending a rising vote of thanks to the speakers the meeting adjourned.

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Minutes of the regular meeting of the New York Branch of the American Pharmaceutical Association, held in the New York College of Pharmacy Building, May 10, 1915, President Roemer in the Chair.

The minutes of the April meeting were adopted as read.

The Treasurer, Member of Council, and Chairmen of the Committees on Membership, Legislation and Education, Fraternal Relations were not present and no reports were received. President Roemer read a letter of regret from Dr. Diekman, Chairman of the Committee on Progress of Pharmacy, explaining his absence.

The committee on "Raymow Resolutions" presented their report, which was adopted, and the committee was discharged with thanks.

THOMAS F. RAYMOW.

WHEREAS, The members of the New York Branch of the American Pharmaceutical Association have learned with great regret of the death of Thomas F. Raymow, a fellow-member, on April 12, 1915.

Be it Resolved, That as an expression of the deep sense of personal loss felt by the members of this Branch, a page in the minutes be set aside for these resolutions, and,

Be it furthermore Resolved, That the members of the Branch hereby extend to his family their deepest condolences in this hour of great bereavement, and,

Be it furthermore Resolved, That the Secretary be directed to forward a copy of these resolutions to the family of our deceased member.

(Signed) JACOB DINER,
JEANNOT HOSTMANN,
OTTO RAUBENHEIMER,
Committee.

Chairman Mayer, for the Dinner Committee, in reporting suggested that the date of dinner be postponed to the fall and, upon motion, the committee was continued with directions to act upon said suggestion.

Dr. Robert A. Hatcher and his associate, Dr. Eggleston Cary, then reported upon their investigations regarding the stability of Infusion of Digitalis. They brought out the following facts: That alcohol is of no value and needless as a preservative agent; that if properly prepared and kept under ordinary conditions the loss in therapeutic activity up

to the end of a period of three weeks is practically negligible; to properly exhaust the leaf it should be in a No. 60 powder, and the infusion should be prepared by maceration for one hour on a bath of boiling water with subsequent filtration.

According to the speakers, the theory that different digitalis preparations possess different therapeutic properties has been finally and positively disproved. Gram for gram the infusion will exhibit exactly the same therapeutic results as the tincture or fluidextract.

A sample of digitalis leaves that had been macerated with an equal weight of water for four months, although completely covered with mould and having the characteristic earthy odor, when tested had only lost 50 percent of its toxic properties.

Following an extended discussion, taken part in by many of the members, a rising vote of thanks was extended to the speakers, who undoubtedly will present a paper at a future date after completion of their investigation.

"Liquid Petrolatum, Russian and American," was the title of a very interesting paper presented by Mr. E. H. Gane, in which he pointed out, that American oils can now be secured that are equally as good as the Russian. Particular stress was laid by the speaker upon the importance of the viscosity rather than the gravity in determining their medicinal value. A line of important tests as well as tabulated results of a series of examinations carried out by Mr. Gane on twelve market samples are given.

The paper called for a spirited discussion, during which the tests as well as the value of various oils were gone over.

After thanking the speaker for his interesting paper nine new members were elected and the Secretary was ordered to send return postal cards to all members asking them to vote upon the desirability of holding semi-monthly meetings beginning with the October meeting.

JEANNOT HOSTMANN, Secretary.

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WEST VIRGINIA.

The West Virginia Branch of the American Pharmaceutical Association held a meeting at the Windsor Hotel, Wheeling, W. Va., on the evening of May 5, 1915, at 8 o'clock. This was the initial meeting of the Branch in Wheeling and was enthusiastically supported by the city pharmacists and those from nearby towns. The Wheeling Druggists' Association, the local organization, had the arrangements in charge and a general invitation was extended to both physicians and pharmacists, as well as to the young men who were presenting themselves before the State Board of Pharmacy for registration examination.

Professor W. A. Schultz, formerly of the U. S. Public Health Service and now head of the Department of Pharmacology of the West Virginia University, and Professor Charles H. Rogers, Dean of the School of Pharmacy, West Virginia University, gave a most interesting discussion on "Some Recent Developments in Physiological Assay." The various methods, both old and new, for assay of the members of the digitalis group, ergot and cannabis were demonstrated. Several samples collected from the trade were assayed and their comparative value determined with regard to preparations made from properly cultivated and collected drug. The discussion and particularly the demonstration of the actual work by specialists in this line of endeavor was a revelation to many present and inculcated a desire in the pharmacists to handle only standardized, dated preparations. Those of the medical profession present, enthusiastically supported such sentiments.

Dr. A. Arkin, Head of the Department of Bacteriology and Pathology of the School of Medicine, West Virginia University, also gave a most interesting discourse on "Biological Products and Their Properties." The understanding of these preparations by the average pharmacist has always been more or less hazy. Dr. Arkin presented the subject in such a manner as to be appreciated and understood by all present.

A number of local gentlemen were heard from, and the pharmacists of West Virginia were urged to appreciate the professional side of their calling and to make the most of it. A vote of thanks was tendered those taking part in the program. The meeting formally adjourned and was succeeded by a social gathering and smoker.

A. B. BERRY, Secretary.

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Courage is the thing which enables a man to tackle a hard task with ease. Nerve is the thing which enables him to tackle it when he's scared to death.—Tips.

Colleges

LOUISVILLE COLLEGE OF PHARMACY.

The Commencement exercises of Louisville College of Pharmacy were held May 11.

The list of graduates follows: Edwin Forest Abbott, Eskdale, W. Va.; Jasper Jones Bailey, Hanson, Ky.; Theophilus P. Brown, Stanford, Ky.; Hugh T. Collins, Lawrenceburg, Ky.; Frank Bernard Dougherty, Jeffersonville, Ind.; Curtis B. Dozier, Thomasville, Ala.; Elias A. Dunbar, Jamestown, Ky.; Luther C. Ellis, Glasgow, Ky.; David U. Garber, Jellico, Tenn.; Ernest S. Julian, Cleveland, Tenn.; Jonathan B. Legg, Clifty, W. Va.; Wilbur R. Parks, Irvington, Ky.; William Orville Patterson, Hawesville, Ky.; Hart L. Perry, Richmond, Ky.; Frank W. Richey, Cannelton, Ind.; Robert W. Schroader, Murray, Ky.; William B. Schultz, Middlesboro, Ky.; Charles H. Tye, Barbourville, Ky.; Vernon Valentine, New Castle, Ky.; Clay Louis Vallandingham, Owenton, Ky.; John W. Wear, Murray, Ky.; Clarence H. Adams, Robert P. Brumleve, Carl J. Eilers, Samuel Levinstein, Harry L. Pfeiffer, Jack Posnansky, Arthur T. Schreiber, Joseph C. Seitz and Karl H. Strober, of Louisville.

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NEW YORK COLLEGE OF PHARMACY.

The George J. Seabury Scholarship has been established in New York College of Pharmacy, having been founded by Dr. Henry C. Lovis in memory and honor of his uncle, George J. Seabury. This scholarship entitles its holder to the fourth year of University study in the College and leads to the degree of Bachelor of Science in Pharmacy. It is therefore open only to the graduates of the three-year University Course, who hold the degree of Pharmaceutical Chemist.

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MASSACHUSETTS COLLEGE OF PHARMACY.

The Commencement exercises of Massachusetts College of Pharmacy were held May 20. The ceremonies were presided over by President C. Herbert Packard and the address to the graduates was deliveerd by A. A. Berle, D. D. The degree of Pharmaceutical Chemist was conferred on: Elmer William Bennett, Ph. G., Westboro; William Charles Bruzga, Ph. G., South Boston; Malcolm Sherwood Field, Taunton; Edward Rudy Gifford, Ph. G., Dorchester; William Wallace Gifford, Ph. G., Dorchester; Robert Mugerdich Kallejian, Pharm. D., Hartford, Conn.; Albert Solomon Pearlman, Ph. G., Boston.

The following received the degree of Graduate in Pharmacy:

Florin Joseph Amrhein, Roxbury; Gilbert Shove Arnold, Jr., Hopedale; Charles Joseph Babb, Middleboro; Edward Romeo Bouthillier, Milford; Raymond Gannett Cooper, South Natick; John Francis Correa, Jr., New Bedford; John Dorenbaum, Springfield; Ovide Albert Dumas, Worcester; Armand Merrill Dupaul, Southbridge; James George Elkind, Worcester; Fay Harold Elliott, Groveton, N. H.; Theodore Gibbs Flagg, Southborough; Joseph Gagne, Willimansett; George Peter Gakidis, Manchester, N. H.; Howard Francis Gilbride, Malden; Rosamond Alice Guinn, New Bedford; Jesse Earl Henry, Cameron, W. Va.; Elmer Severin Johnson, Orange; Zusya Kagan, Roxbury; Jorge Manuel Menendez, Matanzas, Cuba; Joseph Nathan Meyers, Dorchester; Max Samuel Miller, Cambridge; William Joseph Nolan, M. D., New Britain, Conn.; Federico Emilio Perez, Santiago, Cuba; Howard Richard Pierce, Enfield, N. H.; James Weston Pratt, Quincy; Harry Alexander Shapiro, Portsmouth, N. H.; Revashanker Maganlal Shukle, Matar, India; Oakley Smith Skinner, Windsor, Vt.; Alfred Richard Trimbach, Lewiston, Me.; John William Vigeant, Great Barrington.

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MASSACHUSETTS COLLEGE OF PHARMACY AWARDS A. PH. A. PRIZE MEMBERSHIPS.

Five prizes, each consisting of a nomination to membership in the American Pharmaceutical Association and the first year's dues were offered at the Massachusetts College of Pharmacy during the past year, for the best year's records in the senior subjects. The prizes, with their donors and recipients, were as follows: Pharmacy, offered by Professor E H. LaPierre, awarded to Florin J. Amrhein of Roxbury, Mass.; Analytical Chemistry, offered by Dean T. J. Bradley, awarded

to Armand M. Dupaul of Southbridge, Mass.; General Chemistry, offered by President C. H. Packard, awarded to Oakley S. Skinner of Windsor, Vermont; Organic Chemistry, offered by Treasurer John G. Godding, awarded to Harry A. Shapiro of Portsmouth, New Hampshire; and Materia Medica, offered by Professor H. H. Smith, awarded to James W. Pratt of Quincy, Mass.

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SCHOOL OF PHARMACY OF THE UNIVERSITY OF ILLINOIS.

The Commencement exercises of the School of Pharmacy of the University of Illinois were held in New Central Music Hall, Chicago, April 28. Professor Joseph Price Remington delivered the address; Judge O. A. Harker, Dean University of Illinois Law School and representing President Edmund J. James of the University of Illinois, conferred the degrees.

List of the class: Received the degree of Graduate in Pharmacy: Richard Joel Anderson, Chicago; Samuel Leon Baker, Gary, Ind.; Mike Robert Bianco, DuQuoin; Frederick Evenson Boehm, Neenah, Wis.; Marshall Theodore Brekke, Rice Lake, Wis.; Walter Otto Buckrucker, Chicago; Guy Brooks Davis, Abingdon; Ray Robbins Davis, Abingdon; Grover Oliver Drais, Onawa, Iowa; Harry Leo Eberly, Aurora; Roy Fred Fraser, Elizabeth; Victor Leo Geispitz, Chicago; Louis Andrew Gorham, Chicago; Louis Leo Haffner, Bloomington; Ralph Hawthorne, Alma; Michael Jacobson, Chicago; George William Jindrich, Chicago; Archie Kirkwood Johnson, Joliet; Joseph John Kakacek, Chicago; Rudolph Henry Krebs, Milford; Theodore August Joseph Leckband, Grand Mound, Iowa; Charles James Lesko, Chicago; Stephen Edward Malkewicz, Chicago; Bates A. Marriott, Galesburg; Philip Aloysius Masterson, Clinton, Iowa; Franklin Christopher Mueller, Jefferson, Wis.; Frank Charles Niemeyer, Stockton; Oswald Edward Fred Obermiller, Galena; Joseph Winfred Raycraft, Springfield; Robert Charles Reed, Quincy; Harold Franklin Seeger, Beardstown; Bayard Edwin Simmons, Chicago; Ernest Lee Slinkard, Grand Junction, Colo.; Clifford Ross Spalding, Clinton, Iowa; August Ferdinand Stahl, Jr., Chicago; Stewart Strain, Chicago; Roy William Woelffer, Lake Mills, Wis.; Lawson Jacob Cooke (Class of '13), Goodland, Ind.; Fred Lehman Leib (Class of '14), Anna; Lillian Vorsanger (Class of '12), Chicago.

Received a certificate of having finished the course successfully. Will receive the degree when the required age and practical experience are obtained: Monte Allen, Gray's Lake; Kenneth Frederick Allman, Rensselaer, Ind.; Edward Anthony Felix Borucki, Chicago; William Stuhlman Bucke, Chicago; Carroll Edwin Bundy, Sheldon; Byron Eugene Clay, Lena; Raymond Earl Faulkner, Fulton; Richard William Goltermann, Forest Park; Sylvester Henry Hojnacki, Chicago; Oscar William Johnson, Chicago; Harry Kanta, Chicago; Edward Joseph Kral, Chicago; Joseph Benjamin Kvasnicka, Chicago; Arthur Henry McKenty, Chicago; Mark Eldon Neville, Gray's Lake; Joseph Pelc, Chicago; Domingo Poli, Guayama, Porto Rico; Young Rey, Soon Chun, Korea; Edwin Robert Riemer, Chicago; Edwin Palmer Scruggs, Livingston, Ala.; Walter Alanson Vander Bogart, Wilmington; Louis Wischnia, Chicago.

Received certificates as special students: LeRoy Eugene Anderson, Moline; Charles Roy DeWitt, Pocatello, Idaho; Samuel Michael Gordon, Chicago; Charles Hugo Grund, Jr., Chicago; Carl William Hanichen, Chicago; Leslie Eugene Harden, Rockefeller; Anton Sylvester Jaglowski, Chicago; Leopold Levinowitz, Chicago; Otto Lisec, Chicago; George Edward Nemec, Chicago; George Ray Olson, Chicago; Lloyd Earl Throckmorton, Peoria; Sidney Bradley Trippett, Texarkana, Ark.; Clarence Edward Wiles, Kankakee.

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TWO SPECIAL LECTURES AT THE JERSEY CITY COLLEGE OF PHARMACY.

The last of the series of special lectures was delivered at the Jersey City College of Pharmacy on Friday afternoon, April 30, the Faculty, the students, the nurses of the Jersey City Hospital Training Schools and many prominent physicians and pharmacists being present.

Dr. Paul S. Pittenger, Pharmacologist of the H. K. Mulford Company, Philadelphia, and an authority on the subject of Physiological Assays, delivered a highly educational and interesting lecture on "Biological Assays." The following is an outline: In-

troductory, Definitions, List of Drugs requiring Biochemic Assays, Variation in Strength of non-standardized preparations, Necessity for Biologic Assay Methods, Standardization of Crude Drugs, and Deterioration.

Dr. Pittenger briefly described and demonstrated one or more methods coming under *each* of the three types, namely: *First type,* Reed and Vanderkleed Guinea-pig method, Houghton's 12-hour method, Famulaner & Lyon's 1-hour method; *second type,* Blood-pressure method for suprarenal extract, Blood-pressure method for ergot; *third type,* Isolated uterus method for Pituitary.

A rising vote of thanks was given to Dr. Pittenger and his Assistant, Dr. Wall, for this excellent lecture and demonstration.

Dr. B. S. Pollak, Medical Director of the Hudson County Tuberculosis Hospital in Snake Hill, addressed the students on the very important subject, "Problems on the Prevention of Tuberculosis." Dr. Pollak explained the origin and the history of the disease and also the various stages, and he undoubtedly convinced his audience that tuberculosis is one of the most dreadful of all diseases and that all precautions should be taken individually as well as municipally and even under federal control.

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NEW ORLEANS COLLEGE OF PHARMACY.

The New Orleans College of Pharmacy held Commencement exercises May 14 in Marquette Hall of Loyola University, the Dean, Dr. Philip Asher, presiding. The A. Ph. A. membership was awarded to Hypolite Rene Xiques. The following is a list of the graduates:

Leonce J. Aucoin, Louisiana; Rene J. Bienvenu, Louisiana; Mertie M. Bloom, Louisiana; Alvin S. Brizzard, Louisiana; Leon Aloysius Gabrol, Louisiana; George D. Comeaux, Louisiana; Fred Rufo Crosby, Louisiana; W. Elmo Doucet, Louisiana; Edgar E. Ewing, Louisiana; John Robert Germany, Louisiana; Harry Goldstein, Louisiana; Antonio M. Gonzalez y Falcon, Cuba; Odon J. Lonibos, Louisiana; Manuel Lopez y Quintana, Cuba; Eloi L. Melancon, Louisiana; Guillermo Perez y Pena, Cuba; Robert Lane Pollock, Louisiana; Laurance Rappleye Rolling, Louisiana; Miss Anna Barbara Schneider, Louisiana; T. A. Scott, Louisiana; Miss Vernona E. Stumpf, Louisiana; J. Warren Tarbox, Louisiana; Eugene Waldemar Vogt, Texas; George B. Welsh, Louisiana; Harold B. Williams, Texas; Hypolite Rene Xiques, Louisiana.

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ST. LOUIS COLLEGE OF PHARMACY.

The Commencement exercises of the St. Louis College of Pharmacy were held in Sheldon Memorial Hall, May 19.

Dr. John C. Falk, President of the College, conferred the degrees. The Graduate in Pharmacy and Bachelor of Pharmacy Classes were introduced by Dr. H. M. Whelpley, Dean, and the Pharmaceutical Chemist Class was introduced by Prof. Charles E. Caspari.

The Valedictory Address, "Drugs and the Man," was delivered by Mr. Arthur E. Bostwick, Librarian of the St. Louis Public Library.

The alumni prizes were conferred by Dr. Wm. H. Thaler, while Dr. O. A. Wall announced the College prizes and honors.

The following degrees were conferred:

GRADUATE IN PHARMACY.

Louis Abramson, Mgline, Tchernigoff, Russia; Clyde Murphy Anderson, Rockville, Mo.; Leslie William Barnes, Cuba, Mo.; George Bosche, Ph. B., 1911, St. Louis, Mo.; Glenn Adrian Burkart, St. Louis, Mo.; Walter Arden Burkart, St. Louis, Mo.; Paul Augustus Burnette, Ph. B., 1913, St. Louis, Mo.; Philip Ludger Chiles, St. Louis, Mo.; Alfred William Couch, De Soto, Mo.; Curt Louis Dauber, Mascoutah, Ill.; Lyman Armenious Demand, Warrensburg, Mo.; Edmunds Grey Dimond, Winona, Miss.; Gustav Adolph Dorullis, Centralia, Ill.; Joseph Frank Evans, Mountain Grove, Mo.; Joseph Frey, St. Louis, Mo.; Carter Giles Gibson, Hope, Ark.; Willard Arthur Guyton, Potosi, Mo.; Theodore Charles Hagenow, St. Louis, Mo.; Jesse Everett Harmon, Houston, Mo.; Samuel Honigberg, St. Louis, Mo.; Walter Edwin Howald, Cuba, Mo.; Walter Sylvester Hunter, Macon, Mo.; Frank Eugene Lane, Jr., St. Louis, Mo.; Lawrence Roscoe Marglous, St. Louis, Mo.; Albert John Martin, St. Louis, Mo.; Otto John Moser, Ph. B., 1910, St. Louis, Mo.; Andrew Louis Muentefering, East St. Louis, Ill.; Theodore John Nelligan, St. Louis, Mo.; Henry William Reiss, St. Louis, Mo.; Charles Herman Riley, Salem,

Mo.; Kenneth Nye Robinson, Warrensburg, Mo.; E. Francis Sennewald, St. Louis, Mo.; Enos Sanford Sisk, Licking Mo.; Othmar John Sum, Washington, Ind.; Clarence Robert Walker, Hermann, Mo.; George Marcus Weiss, St. Louis, Mo.; Floyd Loftus Welch, Warrensburg, Mo.; Louis Franklin Westlake, St. Louis, Mo.; Farrar McNeal Wilson, Lebanon, Mo.; John Zajicek, Collinsville, Ill.

BACHELOR OF PHARMACY.

Herbert William Bixon, Middlebrook, Mo.; Harry Erwin Grafe, St. Louis, Mo.; Leo George Kohl, Belleville, Ill.; Roland Henry Kraege, Yorktown, Tex.; Walter Scott McCormack, Koshkonong, Mo.; Burl Hulbert Smith, East St. Louis, Ill.

PHARMACEUTICAL CHEMIST.

Harold Rufus Rowe, Ph. G., 1913, Willow Springs, Mo.

The recommendation for membership in the American Pharmaceutical Association, with dues for 1915 given by the College, is awarded to Samuel Honigberg, St. Louis, Mo.

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ALUMNI ASSOCIATION OF THE UNIVERSITY OF ILLINOIS SCHOOL OF PHARMACY.

The thirty-third annual reception and banquet of the Alumni Association of the University of Illinois was held at the Congress Hotel, Chicago, Wednesday evening, April 28. One hundred and twenty-five alumni and friends were present. The members of the graduating class were the guests of the Alumni Association, while the guests of honor were Professor Joseph P. Remington, Dean of the Philadelphia College of Pharmacy, and Judge O. A. Harker, Dean of the Law School of the University of Illinois. Toasts were responded to as follows:

The University of Illinois—Judge O. A. Harker.

Pharmacy—Professor J. P. Remington.

The Alumni Association—President L. L. Mrazek.

The Faculty—Professor W. B. Day.

The Class of 1915—President H. L. Eberly.

The Class of 1890—Dr. Charles A. Albrecht.

Professor C. M. Snow presided as toastmaster. The occasion was a most enjoyable one and a fitting close for a most successful and largely-attended Commencement.

Societies

Related Association Meetings.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

The 1915 convention will be held at Minneapolis, Minn., August 30 to September 5. President, Samuel C. Henry, Philadelphia, Pa.; Secretary, T. H. Potts, Chicago, Ill.

AMERICAN ASSOCIATION OF PHARMACEUTICAL CHEMISTS.

The 1915 convention was held at Rochester, N. Y., in May. President, George C. Hall, New York; Secretary, E. L. Maltbie, Newark, N. J.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS.

The seventh semi-annual meeting will be held at San Francisco, August 25-28. President, George D. Rosengarten, Powers-Weightman-Rosengarten Company, Philadelphia; Secretary, John C. Olsen, Cooper Union, New York.

MANUFACTURING PERFUMERS' ASSOCIATION OF THE UNITED STATES.

President, A. M. Spiehler, of Adolph Spiehler, Inc., Rochester, N. Y.; Secretary, Frank L. Carpenter, of Lazell, Perfumer, New York.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION

The 1915 convention will be held at Santa Barbara, Cal., during September, the date to be fixed later. President, Charles A. West, Eastern Drug Company, Boston, Mass.; Secretary, Thomas F. Main, 81 Fulton Street, New York.

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SECRETARIES OF BOARDS OF PHARMACY.

Alabama—E. P. Galt, Selma.
Arizona—Arthur G. Hulett, Phoenix.
Arkansas—J. A. Gibson, Little Rock.
California—Louis Zeh, San Francisco, Suite 909 Butler Buildng, 135 Stockton St.
Colorado, Wm. F. Thebus, Denver.
Connecticut, J. A. Leverty, Bridgeport.
Delaware, J. O. Bosley, Wilmington.
District of Columbia—W. T. Kerfoot, Jr., Washington.
Florida—D. W. Ramsaur, Palatka.

Georgia—Chas. D. Jordan, Monticello.
Idaho, T. M. Starrh, Twin Falls.
Illinois—F. C. Dodds, Springfield.
Indiana—Burton Cassady, West Terre Haute.
Iowa—H. E. Eaton, Des Moines.
Kansas—W. R. Sheriff, Ellsworth.
Kentucky—J. W. Gayle, Frankfort.
Louisiana—Jos. T. Baltar, New Orleans.
Maine—Frank T. Crane, Machias.
Maryland, Ephraim Bacon, Baltimore, 30th and Calvert Sts.
Massachusetts—Albert J. Brunelle, Boston, 22 State House.
Michigan—Ellis E. Faulkner, Delton.
Minnesota—Edward A. Tupper, Minneapolis, 754 E. 14th St.
Mississippi—W. W. Ellis, Fernwood, Pike County.
Missouri—E. G. Cox, Craig.
Montana—W. R. Montgomery, Butte.
Nebraska—J. Earle Harper, Spencer.
Nevada—J. M. Taber, Elko.
New Hampshire—Herbert E. Rice, Nashua.
New Jersey—Henry A. Jorden, Bridgeton.
New Mexico—B. Ruppe, Albuquerque.
New York—W. L. Bradt, Albany, Edu. Bldg.
North Carolina—F. A. Hancock, Raleigh.
North Dakota—W. S. Parker, Lisbon.
Ohio—M. N. Ford, Columbus.
Oklahoma—J. C. Burton, Stroud.
Oregon—J. Lee Brown, Marshfield.
Pennsylvania—L. L. Walton, Williamsport.
Rhode Island—James E. Brennan, Pawtucket.
South Carolina—F. M. Smith—Charleston.
South Dakota—E. C. Bent, Dell Rapids.
Tennessee—Ira B. Clark, Nashville.
Texas—R. H. Walker, Gonzales.
Utah—Walter H. Dayton, Salt Lake City.
Vermont—Mason G. Beebe, Burlington.
Virginia—T. A. Miller, Richmond.
Washington—D. B. Garrison, Connell.
West Virginia—Alfred Walker, Sutton.
Wisconsin—Edward Williams, Madison.
Wyoming—R. A. Hopkins, Cheyenne.

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FLAVORING EXTRACT MANUFACTURERS' ASSOCIATION.

The next meeting of the Flavoring Extract Manufacturers' Association will meet in Cleveland, July 8-10. W. M. McCormick, of McCormick & Co., Baltimore; J. O. Schlotterbeck, of J. Hungerford Smith Co., Rochester, and Frank L. Beggs, of Styron, Beggs & Co., Newark, Ohio, were appointed a committee to make the necessary arrangements for the meeting.

OFFICERS OF PROPRIETARY ASSOCIATION OF AMERICA.

The following officers and members of the Executive Committee of the Proprietary Association of America were elected for the ensuing year, at their annual meeting held in New York City, May 11-13:

President, A. H. Beardsley, Elkhart, Ind.; First Vice-President, William H. Gove, Lynn, Mass.; Second Vice-President, Allen F. Moore, Monticello, Ill.; Secretary-Treasurer, Charles P. Tyrrell, Syracuse, N. Y., re-elected. Executive Committee, Joseph F. Hindes, Baltimore, Md.; R. R. Land, Binghamton, N. Y.; F. K. Hyde, Buffalo, N. Y.; Will A. Peairs, Des Moines, Ia.; Z. C. Patten, Jr., Chattanooga, Tenn.; Carl J. Balliett, Buffalo, N. Y.; Frank Blair, Chicago.

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MANUFACTURING PERFUMERS' ASSOCIATION OF THE UNITED STATES.

The Manufacturing Perfumers' Association of the United States met in New York City, April 27-29.

Resolutions were adopted by the members indorsing the Stevens bill for retail price maintenance on trade-marked and patented articles, also urging the enactment of a bill seeking to have the internal revenue tax on cologne spirits eliminated, and approving a proposal to affiliate with the Chamber of Commerce of the United States.

OFFICERS FOR 1915-1916.

A. M. Spiehler, of Adolph Spiehler, Inc., Rochester, N. Y., was re-elected President of the Association; S. S. West, of the Abner Royce Company, of Cleveland, Ohio, Vice-President, and Frederick F. Ingram, of the Frederick F. Ingram Company, Detroit, Second Vice-President; Walter Mueller, of A. A. Vantine & Co., New York, Secretary, to succeed Frank N. Carpenter, of Lazell, Perfumer, New York, and A. B. Calisher, of Calisher & Co., New York, was elected Treasurer.

Succeeding Theodore Ricksecker, D. H. McConnell and W. A. Bradley, as members of the Executive Board, the following were selected: D. H. McConnell, of Goetting & Co., New York; V. B. Thomas, of Harriett Hubbard Ayer, Inc., New York, and George R. Merrell, of Chicago.

Mr. Ricksecker was elected an honorary member of the Association.

Chairman Walter Mueller of the Committee on Importation and Undervaluation closed his report by stating that the raw materials used by the foreign and domestic perfumers come from the same sources. As much technical skill and ability are employed by the domestic as by the foreign manufacturers. Isn't it easily possible to educate the American public in the preferred use of the domestic perfumes? It is certainly well worth trying, especially now that conditions abroad favor us with every opportunity for expanding our business both at home and in foreign markets hitherto controlled almost exclusively by the European perfume makers.

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SUBJECTS FOR PAPERS.

The Committee on Papers and Queries of the Pennsylvania Pharmaceutical Association has sent out the following topics for papers. We reprint the list, believing that they will suggest subjects for papers to be presented to one or the other Sections of the A. Ph. A.:

1—There is a popular impression that preventive medicine has lessened prescribing by physicians; that drugs and medicaments are being supplanted by vaccines, sera, etc. Is this true?

2—On what basis are nurses entitled to discounts from pharmacists?

3—Open shop on the Sabbath Day. Necessity or greed?

4—Is the labor or the material the more expensive part of the average prescription?

5—Should the pharmacist dispense prescriptions containing poisonous substances without considering in his charge for the same the responsibility which rests upon him?

6—Do you consider the rebate check as clear profit or merely as a refund for overcharge on the cost of merchandise?

7—A simple method is wanted for making, filling and sealing ampoules in the pharmacy.

8—More data is wanted from those who have employed women as clerks in pharmacies.

9—Wanted: A formula for a non-precipitating compound infusion of gentian.

10—What are the advantages of fat free tincture of digitalis over the U. S. P. tincture?

11—Do you know of anything better than chondrus to suspend silver iodide?

12—What is your system of keeping control on dates of biological and similar products?

13—Data is wanted on making "milk of magnesia" from calcined magnesia.

14—Is there any difference from a therapeutical standpoint between Russian petroleum oil and a fully refined Pennsylvania oil of the same specific gravity?

15—Wanted: Your experience in preparing perfumes from so-called concentrations.

16—What attitude toward your customers would you assume were a demoralizing cut-rate advertising drug store to invade your town?

17—On an average business of $10,000 a year and an investment of $5,000, what percent of gross profit would you figure as necessary to pay you an income of $1,200, after all overhead expense was taken care of?

18—Wanted: Examples of methods employed by retail pharmacists in keeping records required under the Federal anti-narcotic law.

19—Is it inimical to the financial interests of the retailer if all medicinal preparations are required to be labeled in such manner as to reveal their composition?

20—How may the enforcement of the "Truth Advertising law" be useful to legitimate pharmacy?

21—Why should not a state law supplement the Harrison law?

22—Why will the Stevens bill never be placed on the statute books?

23—Are the N. A. R. D. and A. Ph. A. asleep at the switch—vide the Paige bill?

24—What benefit to the pharmacist will the Paige bill bring, if enacted?

25—When hard gelatine capsules are immersed in solution of formaldehyde, how is their solubility in the human body affected?

26—Wanted: A simple method for determining the cathartic principles of cascara sagrada.

27—Have you had any experience in using or selling para dichlor benzene?

28—Would an infusion of digitalis, made double strength as to drug and alcohol, to be afterward diluted, keep; would it be as active?

29—Literature on lime liniment as an ointment base is wanted.

30—What quality liquor calcis can be made from calcined dolomite?

31—How do the grocery store and drug store varieties of cream of tartar compare chemically; as to price wholesale and retail?

32—Value of newspaper advertising to the average drug store.

33—To what extent do people become habituated to the use of drugs not ordinarily considered habit forming?

34—How do the various brands of hydrogen dioxide on the market compare?

35—How can the microscope be made to pay for itself in the drug store?

36—What moral support are pharmacists giving toward the enforcement of anti-narcotic laws?

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MARYLAND ASSOCIATION.

The Maryland Pharmaceutical Association will meet June 22-25 at Braddock Heights. T. M. Williams, of Frederick, the local Secretary, and W. L. Pierce, of Baltimore, Chairman of the Entertainment Committee, have prepared an interesting program. Among the entertainments provided will be a trolley trip to Hagerstown and an excursion to Harpers Ferry.

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LOUISIANA PHARMACEUTICAL ASSOCIATION.

The Louisiana Pharmaceutical Association convened in New Orleans, May 11. Mayor Behrman welcomed the visitors and the response was made by E. H. Walsdorf, U. S. Revenue Collector J. Y. Fountleroy explained the Harrison law, Attorney General Rufus Pleasant spoke of the pharmacists' influence as citizens, Dr. Philip Asher represented the American Pharmaceutical Association. The Stevens bill was unanimously favored.

The following were elected officers for the ensuing year: F A. Earhart, New Orleans, President; Charles McDonald, Port Allen, First Vice-President; Eugene H. Daste, New Orleans, Second Vice-President; George W. McDuff, New Orleans, Secretary, and J. T. Baltar, New Orleans, Corresponding Secretary. The Executive Committee: Peter Rupp, E. S. Bernadas, Joseph P. Walker, S. J. Peters and Marshall B. Castiex. Delegates to the American Pharmaceutical Association: F. C. Godbold, W. G. Hudson and Philip Asher, M. D.

The Executive Committee will select the place of the next meeting. Baton Rouge and Alexandria have extended invitations.

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ARKANSAS ASSOCIATION.

The thirty-third annual meeting of the Arkansas Association of Pharmacists was held in Pine Bluff, May 11-13.

The election of officers for the ensuing year resulted as follows: Booker Latimer, of De Queen, President; W. T. Seawell, Pine Bluff, First Vice-President; A. G. Brown, Luxora, Second Vice-President; Miss Mary A. Fein, Little Rock, re-elected Secretary and Treasurer; J. S. Shields, Forrest City, Chairman of the Executive Committee.

The matter of the next meeting place was left with the Executive Committee. Little Rock and Texarkana both desire the 1916 convention. Texarkana druggists contemplate a joint meeting of the Arkansas and Texas Associations.

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MISSOURI PHARMACEUTICAL ASSOCIATION.

The Missouri Pharmaceutical Association will hold the Thirty-seventh Annual Meeting at Pertle Springs, Tuesday, June 15, to Friday, June 18, inclusive.

President O. J. Cloughly has been active during the past year in the interest of the retail pharmacists. He will report the part taken by Missouri in defeating the proposed war tax on pharmacists.

Professor Francis Hemm, for many years the efficient Chairman of the Committee on Papers and Queries, is making every effort to have a variety of papers appealing to the interest and welfare of pharmacy in Missouri.

Dr. Leo Suppan, Historian, will report what has been accomplished in the way of assembling material pertaining to Missouri pharmaceutical history.

F. H. Fricke, Chairman of the Committee on Legislation, will have a pleasing report, inasmuch as the legislature adjourned without enacting bills detrimental to pharmacy.

Various other standing committees are at work and will submit timely reports.

The Missouri Pharmaceutical Travelers' Association, with J. J. Murphy as President, is looking after the entertainment features. Travelers' Day, as usual, will be celebrated Thursday.

The Missouri Board of Pharmacy will hold an examination Monday and Tuesday. Prospective candidates should communicate at once with the Secretary of the Board, Edwin G. Cox, Craig.

F. W. Robinson, Warrensburg, is the local Secretary and has charge of all arrangements at that end of the line.

As usual, delegates will be in attendance from neighboring state pharmaceutical associations.

H. M. WHELPLEY,
Permanent Secretary.

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KANSAS PHARMACEUTICAL ASSOCIATION.

The Kansas Pharmaceutical Association met in Wichita, May 11-13. Including the families of members, nearly 700 were in attendance. More pharmacy and less of the restaurant idea was advocated. Reform in the drug store was the keynote of an address by J. S. Chism, who spoke for making the business more attractive to better educated young men, who objected to the needlessly long hours. The Stevens bill was endorsed and a strong resolution passed encouraging the authorities in the rigid enforcement of liquor laws.

W. J. Bangs of Madison was re-elected President of the Association; E. E. Bloom, Hutchinson, First Vice-President; B. C. Culp, De Soto, Second Vice-President; D. von Riesen, Marysville, Secretary; J. M. Brunt, Topeka, Assistant Secretary; J. Schmitter, Gypsum, Treasurer, re-elected, and Professor L. E. Sayre, Lawrence, Librarian, re-elected.

J. Floyd Tilford of Wichita was elected Chairman of the Executive Committee; the other members are: R. B. Bird, Winfield; Harry Dick, Lawrence; Edward Dorsey, Ottawa; C. C. Reed, Salina.

The next meeting of the Association will be held in Kansas City, May, 1916.

The Pharmacist and the Law

NEW IOWA LAWS.

The Iowa Association bills that were passed by both houses and are now part of pharmacy laws are:

The Brammer-Jackson bill amends the Pure Drug act so that everybody handling drugs or medicines (including the doctors) must comply with its provisions and be subject to inspection by the pharmacy commission.

The Becker-Taylor bill amends the present pharmacy law so that the State Board can prosecute violations of the pharmacy laws without having to prove a specific sale in each and every case. Convictions under the old law were difficult to obtain because of lack of evidence.

Anti-Narcotic legislation was secured by amendments to different selections of the present statutes. Illegal sale and use by those licensed under the National Act are taken care of under the unprofessional conduct and injunction acts.

The Pharmacy Board has been placed on a salary basis and the state has been divided into three districts, with one member of the board in each of the districts and responsible for the enforcement of the pharmacy laws in his district.

An appropriation has been secured from the state for equipping a laboratory for the use of the board.

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NEW JERSEY NEW ANTI-NARCOTIC LAW.

The New Jersey Anti-Narcotic Law (Ostrom Act) makes it a misdemeanor to sell, give away, except upon the prescription of a duly registered physician, and also to have in one's possession any cocaine, beta-eucaine, alpha-eucaine, tropocaine, novocaine, stovaine, alypin or any salt, derivative or chemical compound of any of these substances or any preparation, admixture or compound containing any of them, or their salts, derivatives or chemical compounds, or chloral hydrate, opium, morphine, codeine, heroin, ethyl-morphine (dionin), diacetyl morphine (heroin), or any salt, derivative or chemical compound of such substances.

AMENDED NEW YORK ANTI-NARCOTIC LAW.

The New York Anti-Narcotic Law conforms to Harrison law as to amounts of exempted narcotics; permits the refilling of prescriptions calling for the exempted amounts of narcotics; words the directions for filing prescriptions in accordance with the Harrison law; permits use of the federal narcotic order blanks instead of state blanks now demanded; compels a physical examination of the patient by the physician before the latter prescribes or dispenses the narcotic; modifies the clause providing for the legal commitment of an addict; and makes the dispensing of narcotics to children under sixteen years a felony.

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OHIO LEGISLATION.

The Platt Law as it may now be called, since there is little doubt of the Governor's approval, places the enforcement of the laws with the State Board of Pharmacy or its Secretary. Substantially with reference to Narcotic Legislation it is an enactment of the so-called Duffey Act changed, only, in that it exempts also preparations which do not contain more than one grain of codeine to the fluid or solid ounce. In this respect a new provision has also been added under which habitual users of narcotics may be examined by a physician appointed by the Probate Judge, and upon certificate issued by such physician, any physician licensed under the laws of Ohio is then authorized to prescribe such drugs for habitual users. The certificate is to be in force for such purpose for a period not to exceed ninety (90) days. The provision is of very doubtful value and is certainly an interference with the practice of legitimate physicians such as has never been contemplated by pharmacists.

With reference to the Poison Law feature of the Platt Bill, it simply places with the Board of Pharmacy the enforcement of the existing Poison Law.

The White Bill, which has also been enacted in the Legislature and which awaits the action of the Governor, provides for a prerequisite in the way of general education and graduation from a College of Pharmacy. The new law will not become operative until 1917.—From report of the Committee on Legislation to the Cincinnati Branch, A. Ph. A., by Chairman F. H. Freericks.

Necrology

THOMAS F. RAYMOW.

Thomas F. Raymow, a member of the Faculty of the Brooklyn College of Pharmacy, serving as lecturer in pharmaceutical Latin and instructor in pharmacy and drug assaying, died of heart disease on April 12, 1915, at the age of thirty-six, at his residence in Flatbush. Until November of last year, Professor Raymow conducted a retail drug store at Beverly road and Coney Island avenue, Brooklyn, when he sold out in order to devote his entire time to teaching and laboratory work. He was active in pharmaceutical affairs, being a member of the Kings County Pharmaceutical Association, of the New York State Board of Pharmacy, and of the American Druggists' Syndicate. He joined the American Pharmaceutical Association in 1913. He is survived by a widow and two children. J. W. E.

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WILLIAM H. WOOD.

William Henry Wood, President of the Maine Pharmaceutical Association, and one of the best known pharmacists in the Pine Tree State, died at his home in Sanford, Maine, on May 19, 1915, after an illness of several months.

Mr. Wood was born in Windham, Me., December 20, 1872. He received his early education in the public schools of Windham, and graduated from the Gorham High School. He then took a course in a business college and later entered the drug store of B. L. Stanwood of Portland as a bookkeeper. Here he made a study of the drug business and decided to make it his life work. In 1895 he went to Springvale and bought the drug store of Dr. B. M. Moulton. Mr. Wood received his collegiate education in the Buffalo School of Pharmacy, graduating in 1899. In the big Springvale fire of April 15, 1905, Mr. Wood's store was destroyed. He opened a small store in one of the first buildings erected in the city after the fire, but soon sold out to L. B. Trafton, and accepted a position as clerk in a Boston drug store, and later, Mr. Wood conducted a drug store at Beverly, Mass., but soon sold this and on December 1, 1908, bought the drug store of Charles A. Trafton in Sanford, which he built up into a most successful business.

Mr. Wood was elected President of the Maine Pharmaceutical Association at Bangor in 1914, and the choice was a most popular one. He served on various committees of the Sanford Board of Trade, and last year was president of that body. He was town clerk of Sanford from March, 1901, to March, 1903. He served several years on the Republican Town Committee prior to the campaign of 1912, when he joined the Progressive Party. He was a member of the Unitarian Church and was active in the organization of this church in Sanford. He was a member of the Springvale Lodge, No. 190, F. & A. M., White Rose Chapter, of Royal Arch Masons, Fluellen Tribe, I. O. R. M., Mousam River Lodge, K. of P.; and Washington Council, J. O. U. A. M.

Mr. Wood was married on Christmas day, 1895, to Miss May Weymouth of Portland, Me., who survives. He is also survived by his mother in Windham, and a brother, Bert Wood, of Boston. J. W. E.

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FRANK D. MORSE.

Frank Dana Morse, of Portland, Me., died in that city on March 30th. Mr. Morse was born in Portland in 1873, was an honor graduate of the New York College of Pharmacy, and was connected with H. H. Hay Sons, the well-known drug firm of Portland, for twenty years. Mr. Morse was unmarried; he is survived by two sisters.

He became a member of the American Pharmaceutical Association in 1902.

J. W. E.

Council Business

COUNCIL LETTER No. 20.

Philadelphia, Pa., March 19, 1915.

To the Members of the Council:

Gentlemen—The following communication has been received:

"Members of the Council:

Gentlemen—Bids for the composition, printing and binding of the Year Book, 1913, (Volume 2), were invited from the J. B. Lippincott Co. of Philadelphia, the Stoneman Press Co. of Columbus, Ohio, W. J. Dornan of Philadelphia, and the Eschenbach Printing Co. of Easton, Pa.

The Committee on Publication made a careful examination of the bids and found that the two lowest bidders were the Stoneman Press Co. and the Eschenbach Printing Co., and these companies were then asked to submit a tentative estimate of cost based on three thousand copies of the book, having 300 pages of 10 point leaded composition, 100 pages of 8 point leaded composition, and 50 pages of 6 point leaded composition, and paper, printing and binding as per copy, in accordance with the terms and conditions set forth in specifications furnished.

The paper in the original bids was specified as 24 x 38, 65 pound, 480 sheets to the ream, and this being heavier than the 1912 Year Book, these firms were asked to name the allowance that would be granted if 25 x 38, 60 pound, 480 sheets to the ream paper was used instead. The estimates submitted were as follows:

STONEMAN PRESS CO.

For your information we submit the following:

300 pages, 10 point, leaded 2 point @ 68c per page	$204.00
100 pages, 8 point, leaded 2 point @ $1.00 per page	100.00
50 pages, 6 point, leaded 2 point @ $1.65 per page	82.50
Difference between 6 point leaded and solid per page	.60
The above item, and items of tabular matter, figure work, brace work, and formulas, cannot be determined until after completion of the book.	
3000 copies, 450 pages, no composition, including paper, press proofs of galleys, make-up, press work, wrapping and cartons, binding, labeling (labels not addressed by us) ready for delivery f. o. b. Columbus to authorized agent of the Association for	1350.00
	$1736.50

If 25 x 38, 60 pound paper is used, instead of 25 x 38, 65 pound paper, the following allowance will be made: 450 pages, $20 (same rate for more or less pages).

ESCHENBACH PRINTING CO.

Assuming the following estimated number of pages of the three kinds of composition, 3000 copies of your book will cost according to the above figures as follows:

300 pages 10 pt. leaded composition	$0.82	$246.00
100 pages 8 pt. leaded composition	1.04	104.00
50 pages 6 pt. leaded composition	1.78	89.00
Paper, printing and binding per copy	.375	1125.00
		$1564.00

The substitution of a 25x38, 60 pound paper for the sheet you have specified which is equivalent to a sheet 25x38—70 you will save $33.00 from the above figures. The chief saving, however, would be in postage and express rates.

The price quoted above includes the cost of

wrapping and furnishing of cartons ready for mailing or expressage, but does not include the addressing and stamping; this will cost 1 cent per copy additional.

From this data, it is evident to your Committee on Publication that the bid of the Eschenbach Printing Co. is $172.50 less than the bid of the Stoneman Press Co. for the *heavier* paper, and $185.50 less for the *lighter* paper, and the Committee therefore decided, subject to the approval of the Council, to award the contract to the Eschenbach Printing Co. as the lowest bidder.

With reference to the facilities of the Eschenbach Printing Co. for handling the work, it may be stated that this company prints the "Journal of the American Chemical Society," "Chemical Abstracts," and "The Journal of Industrial and Engineering Chemistry," published by the American Chemical Society, and with reference to the character of their work and service, Charles L. Parsons, Secretary of the American Chemical Society, writes us as follows:

"I will state that the Eschenbach Printing Co. have done faithful and prompt work for the American Chemical Society. We have several times revised our contract and put out bids to other firms, but in every instance have gone back to the Eschenbach Printing Co. during recent years. We have only good words for the service they have rendered to us. Proofs have always been sent in promptly, and they have, I think, one of the most efficient proof readers in the country. I am very glad that I can give this favorable report."

The Secretary of the Columbia University of the City of New York writes:

"The Eschenbach Printing Co., of Easton, Pa., has done a great deal of work for us in the past few years, and we have found them very satisfactory."

Very truly yours,
J. W. ENGLAND,
Chairman of the Committee on Publication.

Do you approve of the action of the Committee on Publication in awarding the contract for printing the 1913 Year Book (Volume 2) to the Eschenbach Printing Co. of Easton, Pa.? This will be known as *Motion No.* 34 (*Approval of Action of Committee on Publication in awarding the contract for printing the* 1913 *Year Book* (*Volume* 2) *to the Eschenbach Printing Co., of Easton, Pa.*). J. W. ENGLAND,
Secretary of the Council.
415 N. Thirty-third Street.

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COUNCIL LETTER No. 21.

Philadelphia, Pa., March 30, 1915.

To the Members of the Council:

Gentlemen—*Motions No. 32* (*Appropriation of $100 from Centennial Fund for Research Work on Medicinal Plants, etc.*), *No. 33* (*Election of Members; Applications Nos. 88 to 101, inclusive*), and *No. 34* (*Approval of Action of Committee on Publication in Awarding the Contract for Printing the 1913 Year Book* (*Volume 2*) *to the Eschenbach Printing Co., of Easton, Pa.*), have each received a majority of affirmative votes.

The following communication (March 17) addressed to the Council, from E. G. Eberle, of Dallas, Texas, has been received:

"I am advised of my election as Editor of the Journal of the American Pharmaceutical Association.

I feel assured that the Council members have voted their conclusions relative to that which they deemed for the best interests of the Association.

Aside from presenting my application, the only effort put forth by me was to assure them that these were my views and that I would accept their judgment, whatever that might be, accordingly.

I now desire to thank the Council for the honorable and responsible position conferred upon me, and inform them that I will exert my best efforts for the Association and in serving the membership.

In connection with the subject of program for the next annual meeting of the Association, W. C. Alpers writes:

"I would like to make the following suggestion in reference to the program of our next meeting. Ever since the present method of electing officers of the Association has been in use, complaints have been made that the installation of the new officers is not conducted properly. In former years this installation was one of the most pleasant and dignified parts of the meeting. Everybody looked forward to it with pleasure and some of the nicest speeches of our records were made on that occasion. I would suggest that the former method of installation be revived and that a fixed hour be set for it, and therefore propose that the program be changed so that after the line: 10:30 A. M., Final General Session (Friday), the following be inserted. 12 M., Installation of Officers."

The "Tentative Program for the Sixty-third Annual Meeting" adopted provides for, on Friday, August 13, the "Final General Session" at 10:30 A. M., and an "Adjourned Final General Session" at 1:30 P. M. The "Installation of Officers" in the past has generally been the final act of the final session. If Dr. Alper's suggestion is approved by the Council it might be well to make the hour at the time of the Adjourned Final Session (1:30 P. M.) instead of noon.

The following communication from T. A. Miller, President of the National Association

of Boards of Pharmacy, to the Secretary of the Council has been received:

"Replying to your letter of the 18th inst., in regard to the program, will say that at our meeting of the Executive Committee held in Washington last week, and also a conference with similar committees from the Conference of Pharmaceutical Faculties, we decided that we would hold our meeting on Thursday, Friday and Saturday preceding the meeting of the A. Ph. A. so that it would not be necessary to hold any dates open during the meeting of the A. Ph. A. If you would transmit this to the Council and thank them for the courtesy that they have been extending to us, I would appreciate it very much."

J. W. ENGLAND,
Secretary of the Council.

415 N. Thirty-third Street.

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COUNCIL LETTER No. 22.

Philadelphia, Pa., April 10, 1915.

To the Members of the Council:

Gentlemen—Motion No. 31 (C. L. No. 18, 62) having been approved by the Council and Mr. Eugene G. Eberle having accepted election as Editor and Advertising Manager, arrangements were made whereby he assumed the duties of the office on April 6, 1915, at Columbus, Ohio. It was at first thought possible that Mr. E. C. Marshall might be released on April 1, to comply with his expressed wish to be relieved from active duty as soon as possible, Mr. E. G. Eberle beginning service April 1. But Mr. Eberle could not reach Columbus until April 6, and Mr. Marshall remained in charge of the Journal until Mr. Eberle's arrival.

The Committee on Publication recommend to the Council that, as Mr. E. C. Marshall was relieved from duty on the Journal by Mr. E. G. Eberle on April 6, Mr. Marshall be paid for one week's service in April, and be given three weeks' vacation with pay from April 7, at the same rate of salary he has been receiving as Acting Editor.

Very truly yours,
J. W. ENGLAND,
Chairman of Committee on Publication.

Do you favor the above recommendation of Committee on Publication? It will be known as *Motion No. 35 (Payment for Mr. Marshall's Services and Vacation)*.

Motion No. 36 (Election of Members). You are requested to vote on the following applications for membership:

No. 102. Herbert Ninian Beall, 1525 Connecticut Ave., N. W., Washington, D. C., rec. by Samuel L. Hilton and H. E. Kalusowski.

No. 103. Francis Joseph Perusse, 2740 Arlington Ave., Lincoln, Neb., rec. by Rufus A. Lyman and Elsie Day.

No. 104. Albert John Martin, 2230 Oregon Ave., St. Louis, Mo., rec. by Glenn A. Burkart and Theo. C. Hagenow.

No. 105. Henry Louis Jerger, Jr., Broad St., Thomasville, Ga., rec. by R. Thomas and W. B. Day.

No. 106. Anthony C. Cost, 18 South Market St., San Jose, Cal., rec. by N. A. Pellerano and Wm. B. Day.

No. 107. William Robert Englert, 407 Commercial St., Elko, Nevada, rec. by W. B. Day and J. M. Taber.

No. 108. James Frank McGogy, 4727 Brooklyn Ave., Seattle, Wash., rec. by C. W. Johnson and Edith Hindman.

No. 109. Dr. Joila Estrella Delgado, Jagney Grande, Province of Mantanzas, Cuba, rec. by Jose P. Alacan and Jose Guillermo Diaz.

No. 110. Mattys Jongeward, 154 A St., N. E., Washington, D. C., rec. by W. B. Day and J. W. England.

No. 111. Henry Otto Haeusgen, Anchorage, Ky., rec. by Oscar C. Dilly and Arthur L. Sicter.

No. 112. Rudolph Victor Miersch, 1132 W. Broadway St., Louisville, Ky., rec. by Oscar C. Dilly and Arthur L. Sicter.

No. 113. Gordon Laten Curry, 104 W. Chestnut St., Louisville, Ky., rec. by Oscar C. Dilly and Arthur L. Sicter.

J. W. ENGLAND,
Secretary of the Council.

415 N. Thirty-third Street.

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COUNCIL LETTER No. 23.

Philadelphia, Pa., May 1, 1915.

To the Members of the Council:

Gentlemen—*Motion No. 35 (Payment for Mr. Marshall's Services and Vacation)*, and *No. 36 (Election of Members; Applications Nos. 102 to 113, inclusive)*, have each received a majority of affirmative votes.

The following communication has been received from General Secretary Day:

"I have been in correspondence with five or six parties in regard to the stenographic report of the 1915 Convention. I have selected Lenhardt & Co. of Chicago as a firm of reliable stenographers who have made the lowest bid and who apparently can offer the best service. This is a Chicago firm, but will maintain offices in San Francisco during the summer and will be in a position to take care of our work satisfactorily.

"The offer of Lehnhardt & Co. is as follows:

"To furnish two stenographers for five days each	$ 75.00
estimated—500 pages of transcript at 40c a page	200.00
Total	$275.00

"A page of transcript includes approximately 250 words.

"We have paid for reporting the Convention at Detroit $379.18. I desire to have permission of the Council to let the contract for

reporting the Convention to Lehnhardt & Co."

Do you favor award of above contract? This will be known as *Motion No. 37 (Award of Contract for Reporting 1915 Annual Meeting, A. Ph. A., at San Francisco)*.

The following report has been received:

Camden, N. J., April 10, 1915.

To the Members of the Council of the American Pharmaceutical Association:

Gentlemen—In compliance with the directions of the Council, I have sent to the Editor for publication in the Journal, monographs on the following topics, and submit the list of these monographs to the Council as a record of the progress in the work of the Committee on Unofficial Standards.

Respectfully submitted,
GEORGE M. BERINGER,
Chairman.

Alumini Chloridum	Chimaphila
Alumini Sulphas	Chirata
Antomonii Oxidum	Condurango
Antimonii Sulphidum Purificatum	Conium
	Convallaria
Berberis	Crocus
Bismuthi Citras	Cupri Sulphas
Brayera	Cypripedium
Bromum	Eupatorium
Calcii Phosphas Præcipitatus	Euonymus
	Extractum Carnis
Calendula	Fæx Compressa
Cassia Fistula	Ferri Hypophosphis
Cataria	

Motion No. 38 (Election of Members). You are requested to vote on the following applications for membership:

No. 114. Washington Hayne Zeigler, 213 Rutledge Ave., Charleston, S. C., rec. by E. A. Ruddiman and Wm. B. Day.

No. 115. Harry F. J. Guenther, 6430 St. Clair St., Cleveland, Ohio, rec. by Eugene R. Selzer and H. M. Whelpley.

No. 116. Milton M. Taylor, 602 Franklin St., Tampa, Fla., rec. by E. Berger and D. W. Ramsaur.

No. 117. Carlisle Laughlin, 2032 Bancroft Way, Berkeley, Cal., rec. by J. H. Beal and Albert Schneider.

No. 118. Maud Lambert, Ph. G., Franklin Road Pharmacy, Roanoke, Va., rec. by Ernest L. Brandis and Albert Bolenbaugh.

No. 119. Chas. A. Fraser, Red Rock, Okla., rec. by J. C. Burton and H. M. Whelpley.

No. 120. John D. Humphrey, Bristow, Okla., rec. by J. C. Burton and H. M. Whelpley.

No. 121. Hilary S. Shackelford, Wynnewood, Okla., rec. by J. C. Burton and H. M. Whelpley.

No. 122. Morris Wilson Waters, 1344 Wisconsin Ave., N. W., Washington, D. C., rec. by S. L. Hilton and J. W. England.

No. 123. L. C. Gill, University Club, Ancon, Canal Zone, Panama, rec. by H. M. Whelpley and J. W. Mackelden.

No. 124. Bolivar Jurado, Panama, Republic of Panama, rec. by H. M. Whelpley and J. W. Mackelden.

No. 125. Kenneth Nye Robinson, 121 West Gay St., Warrensburg, Mo., rec. by J. W. Mackelden and Albert J. Martin.

No. 126. Martin Elliott Shultz, Punta Rassa, Fla., rec. by H. M. Whelpley and J. W. Mackelden.

No. 127. Ellis Jayson Starwalt, 1371 12th St., Detroit, Mich., rec. by F. F. Ingram, Jr., and Geo. J. Elliott.

No. 128. James Albert Winterbottom, Pharmacist, U. S. N., Las Animas, Colorado, Naval Hospital, rec. by J. A. Rupert and H. M. Whelpley.

No. 129. George W. Rhodes, Newark, Del., rec. by John O. Bosley and R. M. Kaufman.

No. 130. Walter R. Keys, Clayton, Del., rec. by John O. Bosley and R. M. Kaufman.

No. 131. Owen Hilary Tansey, 1106 Green Ave., Westmount, Province of Quebec, Canada, rec. by Alex. J. B. Moore and Wm. B. Day.

J. W. ENGLAND,
Secretary of the Council.
415 N. Thirty-third Street.

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WAR DEPARTMENT.

List of changes of stations covering period ending March 31, 1915, in the cases of Sergeants First Class, and Sergeants, Hospital Corps.

SERGEANTS FIRST CLASS.

William F. Coleman, from the U. S. Disciplinary Barracks, Leavenworth, Kan., to the 2nd Division for station.

Frank Holt, from the Philippine Department, to the U. S. on furlough.

John R. Behre, from the Philippine Department, to the U. S., on furlough.

Nealey Prater, from the Philippine Department, to the Presidio of Monterey.

SERGEANTS.

James J. Johnson, from the Transport "Sumner," to the U. S. Mine Planter Gen. Royal T. Frank.

Halbert M. Beasley, from the transport "Kilpatrick," to the Attending Surgeon's Office, Port of Embarkation, Galveston, Texas.

Joseph Alston, from the Presidio of Monterey, to Field Hospital Company No. 2.

Charles H. Dabbs, from the Department Surgeon's Office Eastern Department, to the Philippine Department.

Otto F. Van Buren, from the Presidio of San Francisco, to Ft. Lawton.

Albert C. Calish, from Ft. Lawton, to the Presidio at San Francisco.

Frank W. Chamberlin, from Field Hospital Company No. 3, to Ambulance Company No. 8.

George H. Spicer, from Ambulance Company No. 3, to Ambulance Company No. 8.

James L. Wood, from Ft. H. G. Wright, to Ft. Terry.

Robert E. L. Rogers, from the Philippine Department, to Ft. Monroe.

Charles Wood, from the Philippine Department, to the U. S. Disciplinary Barracks, Ft. Leavenworth, Kan.

Walter S. McWhorter, from the Philippine Department, to Jefferson Barracks.

Sebald J. Fichtner, from the Philippine Department, to the U. S., for discharge.

Ernest Arias, from the Philippine Department, to the Letterman General Hosp.

William Q. Fancher, from the Philippine Department, to the U. S. for furlough.

Charles N. Abel, from the Philippine Department, to Ft. DuPont.

Harry Cook, from the U. S. Disciplinary Barracks Ft. Leavenworth, to Washington Barracks.

Arthur M. Spencer, from Ft. Liscum, to Ft. Lawton.

John A. Baker, from the Walter Reed General Hospital, to Field Hospital Co. No. 5.

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NATIONAL COMMITTEE ON THE PHARMACEUTICAL SYLLABUS.

BULLETIN IV.

E. G. Eberle has been appointed editor of the Journal of the American Pharmaceutical Association and requests, for use as frontispieces in the Journal, the plates of portraits of deceased pharmaceutical workers that were prepared for the Syllabus but not used. The Secretary has sent the plate of A. B. Prescott to Mr. Eberle, as requested, for use in the May number of the Journal and the following motion is submitted to the Committee:

Motion 271, by E. G. Eberle, seconded by T. J. Bradley:

That the Journal of the American Pharmaceutical Association be permitted to use the Committee's plates of portraits of deceased pharmaceutical workers.

Changes of Address

All changes of address of members should be sent to the General Secretary promptly.

The Association will not be responsible for non-delivery of the Annual Volume or Year Book, or of the JOURNAL unless notice of change of address is received before shipment or mailing.

Both the old and the new address should be given, thus:

HENRY MILTON,
From 2342 Albion Place, St. Louis, Mo.
To 278 Dartmouth St., Boston, Mass.

Titles or degrees to be used in publications or in the official records should be given, and names should be *plainly* written, or typewritten.

<>

NILES, E. H.,
From 1500 E. Michigan St., Indianapolis, Ind.,
To 725 Century Bldg., Indianapolis, Ind.

SORDS, THOS. V.,
From 315 Pearl St., Cleveland, Ohio,
To 1410 W. 25th St., Cleveland, Ohio.

BEST, JOHN,
From residence unknown,
To 2015 E. 12th St., Denver, Colo.

DYER, NICHOLAS E.,
From 981a Tremont St., Boston, Mass.,
To residence unknown.

MARCUS, SAMUEL,
From Ft. Mills, Corregidor, P. I.,
To residence unknown.

BARTELLS, GEO. C.,
From 130 E. State St., Camp Point, Ill.,
To 314 No. Illinois St., Camp Point, Ill., (Adams Co.).

GUERRERO, LEON M.,
From 117 Calle Nueva Ermita, Manila, P. I.,
To 117 Calle A. Mabini Ermita, Manila, P. I.

MONTGOMERY, MOSES,
From Manila, P. I.,
To Scout Garrison, Ft. Mills, P. I.

SUPPAN, LEO R. A.,
From 2648 Russell Ave., St. Louis, Mo.,
To 2112 Oregon St., St. Louis, Mo.

RODEMOYER, WM. E.,
From Hazelwood & Murray Aves., Pittsburgh, Pa.,
To 773 Hazelwood Ave., Pittsburgh, Pa.

WIEDMANN, HUGO E.,
From 1105 Holland Bldg., St. Louis, Mo.,
To Chemical Bldg., St. Louis, Mo.

EMLEN PAINTER

Elected President of the American Pharmaceutical Association at the San Francisco Meeting in 1889. Died before the expiration of his term of office, January 10, 1890.

EMLEN PAINTER
1844-1890
Thirty-seventh President of the
American Pharmaceutical Association